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UNITED AIR SERVICE

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HEARING

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON MILITARY AFFAIRS

HOUSE OF REPRESENTATIVES

SIXTY-SIXTH CONGRESS

SECOND SESSION

SUBCOMMITTEE

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UNITED AIR SERVICE.

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Thursday, December 4, 1919.

The subcommittee this day met, Hon. Fiorello H. LaGuardia presiding.

Members of subcommittee present: Representatives Hull, Caldwell, Fisher, and Olney.

There were also present: Representatives Anthony, McKenzie, Greene, Crago, Sanford, Fields.

Mr. ANTHONY. Mr. Crowell, it is our understanding that you have some recommendations to make to us, especially along the lines of aviation. Am I correct in that?

Mr. CROWELL. I should like and appreciate the opportunity.

Mr. ANTHONY. For your information I would say that the committee has asked the subcommittee on aviation of which Mr. LaGuardia is the acting head, to take up specially aviation matters, and especially the consideration of the Hull bill and the Curry bill, providing for a separate aviation organization. They intend to hold hearings on that subject, and we would be very glad this morning if you would give us your ideas on that subject, so that the work of this subcommittee could start with your ideas.

Mr. CROWELL. I thank you for the opportunity, and I will endeavor to make my statement very brief.

STATEMENT OF HON. BENEDICT CROWELL, ASSISTANT SECRETARY OF WAR, ACCOMPANIED BY LIEUT. COL. ARTHUR O'BRIEN.

Mr. LAGUARDIA. Mr. Crowell, before proceeding with your statement, I would like to ask you several questions. You are the Assistant Secretary of War?

Mr. CROWELL. Yes.

Mr. LAGUARDIA. How long have you been in the War Department?

Mr. CROWELL. I came here in the fall of 1916 and have been here ever since, working with the War Department in various activities.

Mr. LAGUARDIA. Were you assigned to make a special study of aviation matters?

Mr. CROWELL. Yes.

Mr. LAGUARDIA. By whom?

Mr. CROWELL. By Secretary Baker.

Mr. LAGUARDIA. Pursuant to such assignment, what was done?

Mr. CROWELL. After many discussions of the subject with him, we decided that the situation in Europe and the progress that had been made in Europe in the organization of aviation must necessarily be included in our analysis of the subject, and he asked me to go to Europe to make a study of aviation, taking with me men who were able to cover all branches of aviation.

Mr. LAGUARDIA. So you formed a sort of committee or commission?

Mr. CROWELL. Yes.

Mr. LAGUARDIA. Will you kindly state who composed this committee?

Mr. CROWELL. I gave a great deal of thought to the formation of this committee.

Mr. LAGUARDIA. Along what lines? So as to have every branch——

Mr. CROWELL (interposing). So as to get experts; and I wish to say that I am not one. I tried to get the best men in the country in order to cover it from all points of view. The men I took were Mr. Howard E. Coffin——

Mr. LAGUARDIA (interposing). Who was?

Mr. CROWELL. A member of the Council of National Defense, and who had had a great deal to do with aviation during the war. Capt. Henry C. Mustin, of the United States Navy, who was a practical flyer, had been a flyer for a long time, and had given a great deal of his attention to naval aviation.

Mr. LAGUARDIA. Did he have charge of naval aviation during the war?

Mr. CROWELL. He was the senior flying officer of the Navy.

Mr. LAGUARDIA. And had charge of aviation matters during the war?

Mr. CROWELL. I do not know whether he had charge or exactly what his different positions were during the war, but he was highly recommended to me by the Navy Department as being the officer best adapted to this work. Col. Halsey Dunwoody, Air Service, United States Army. Col. Dunwoody was the chief of aircraft production of the American Expeditionary Forces.

Mr. LAGUARDIA. And Chief of the Air Service?

Mr. CROWELL. I think Assistant Chief of the Air Service. Col. James A. Blair, jr., of the General Staff.

Mr. LAGUARDIA. Was he designated by the General Staff?

Mr. CROWELL. No; I designated all of this personnel on the advice of those with whom I conferred.

Mr. LAGUARDIA. But Col. Blair was assigned to you, and you selected him on the suggestion and advice of the General Staff?

Mr. CROWELL. No; I selected all of these men myself. Col. Blair had been quite prominent in aviation matters before the war; he was one of those who was early interested. Mr. George H. Houston, president of the Wright-Martin Airplane Corporation, the corporation which produced the Hispano-Suiza motors; Mr. C. M. Keys, vice president of the Curtiss Aeroplane & Motor Corporation; and Mr. S. S. Bradley, general manager Manufacturers' Aircraft Association.

Mr. LaGuardia. And you went abroad?
Mr. Crowell. Yes.
Mr. LaGuardia. The full committee?
Mr. Crowell. Yes.
Mr. LaGuardia. With the exception of Col. Dunwoody? You met him in Paris?
Mr. Crowell. Yes.
Mr. LaGuardia. You visited England?
Mr. Crowell. Yes.
Mr. LaGuardia. And France?
Mr. Crowell. Yes.
Mr. LaGuardia. And Italy?
Mr. Crowell. Yes.
Mr. LaGuardia. And you conferred with the leaders of aviation?
Mr. Crowell. Yes.
Mr. LaGuardia. In those three countries?
Mr. Crowell. Yes.
Mr. LaGuardia. You may now proceed, Mr. Crowell.
Mr. Crowell. Gentlemen, I should first like to quote the instructions from the Secretary of War which were given at the time this mission sailed, in the form of an interview to the press:

> I am asking Mr. Crowell and his associates to get all the information they can on the development of aircraft and the plans there are abroad among civilized peoples for the development of the airship as an instrument of civilization, whether for war or for peace service; and, as far as they can, I hope they will collect all this information and bring it back and make a report, and perhaps make exhibits which we can lay before any committee of Congress which is interested in the subject, whether it is the Military Affairs Committee dealing with the airplane as an implement of war or whether it is any other committee dealing with it as an implement of commerce and industry.

The mission was made up, as far as possible, to comprise all phases of aviation—representative of the Army, Navy, and commercial interests. The mission made an exhaustive study in the three countries under the three general headings: Organization, technical development, and commercial development. The report of the aviation mission, as of July 19, 1919, was submitted by me to the Secretary of War. It recommended the concentration of the air activities of the United States—military, naval, and civilian—within the direction of a single Government agency created for the purpose, coequal in importance with the departments of War, Navy, and Commerce.

Up to the time of my leaving for Europe I held no definite views on the future treatment of aviation. I of course knew, through my position in the War Department, the enormous problems we had to face during the war, and that experience forced upon me the feeling that it was of vital importance that something should be done to provide against a repetition of the situation that existed during the emergency.

Mr. LaGuardia. You had lived through that?
Mr. Crowell. Yes; indeed I had. After more than seven weeks spent abroad, where I was given every possible facility and opportunity to study what those countries were doing and talk with the men who had control during the war and were shaping the policies for the future, I have become convinced that the only solution of our future air policies is an air department; that only through such a

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department will it be possible for this country to keep abreast with the other great powers.

Among the representative men with whom the mission discussed this subject was Winston Churchill, Secretary of State for War and Secretary of State for Air, who said that the British Air Ministry organization, although not perfection, is the best plan yet developed; it is founded on actual war experience. There is no possibility of England reverting to the prewar organization.

I will read here a short extract from the speech of Lord Fisher, of Great Britain.

Mr. LaGuardia. It is very recent, is it not?

Mr. Crowell. It is dated November 16.

Mr. LaGuardia. 1919?

Mr. Crowell. Yes. He was First Sea Lord of the Admiralty.

By land and by sea the approaching aircraft development knocks out the present fleet, makes invasion practicable, cancels our country being an island, transforms the atmosphere into a battle ground of the future. There is only one thing to do to the ostriches who are spending these vast millions on what is as useful for the next war as bows and arrows. Sack the lot. As the locusts swarmed over Egypt, so will aircraft swarm in the heavens, carrying inconceivable cargoes of men and bombs, some fast and some slow. Some will act like battle cruisers and others as destroyers. All cheap and—this is the gist of it—requiring only a few men as crew.

Mr. Fisher. I should like to ask a question right there. During the war, as I remember it, Mr. Coffin was one of the directors of the Air Service of our Nation that formulated the plans; during the war the Air Service had practically a single organization, as is contemplated in your recommendation. I take it they had free rein during the war, did they not?

Mr. Crowell. No; they did not.

Mr. Fisher. It was my understanding during the war, from my conferences at different times with Mr. Coffin, that that board had practical control of the Air Service—the board of which Mr. Coffin was a member during the war.

Mr. Crowell. It had no authority at all.

Mr. Caldwell. But the law gave that authority, as I understand.

Mr. Fisher. Were not their recommendations followed? I have always understood from the War Department that it looked to this board to govern them in the policies of the Air Service; that is, the board of which Mr. Coffin was a member during the war, and that it was the mistakes in aviation of those men that caused what was called the breakdown in the Air Service. Did the board have any authority? You say they had no authority. I mean the board of which Mr. Coffin was a member.

Mr. Crowell. Mr. Caldwell said it had such authority.

Mr. Caldwell. We passed a statute during the war creating an Aircraft Production Board, of which Mr. Coffin was a member, and it was an organization composed of the chief of the Air Service of the Army, the Navy, and other men designated in the statute, and nothing could be done by any branch of the Air Service in any department or any other place without the approval of those people.

Mr. Crowell. But the board had no direct authority to act.

Mr. Fisher. Were not their recommendations almost invariably followed?

Mr. LaGuardia. Let me make this statement. As you point out, this board, which received official life by an act of Congress, after it was in existence as an unofficial body was still between the two powers, the Navy Department and the War Department, and all that they had to do and the limit of their jurisdiction was simply to make suggestions on the matter of production—that is correct, is it not?

Mr. Crowell. That is my understanding.

Mr. Caldwell. And that is where they fell down?

Mr. LaGuardia. Because they had no power.

Mr. Crowell. The aircraft department of the War Department was continually changed and reorganized during the war, and it was not until, I think, about September 1, 1918, that all the activities of the War Department were put under one head.

Mr. Fisher. Then do I understand that the recommendations made by this aircraft board were almost invariably not followed by the War Department?

Mr. Crowell. That I can not say.

Mr. Fisher. You are not familiar with that?

Mr. Crowell. I can not say.

Mr. Fisher. In view of the fact that Mr. Coffin was on this commission, of which you were a member, and the fact that he was a member of the board that controlled practically the Air Service during the war, I was interested to know just wherein his mistakes were found during the war, because he was practically in control of a single Air Service, as I understood it from him during the war and from his articles in the press, and now he recommends a separate Air Service. The complaint throughout the country is that the Air Service during the war was not a success, yet it was a separate service during the war, and that being so, I am interested to know wherein mistakes were made.

Mr. LaGuardia. May I reply to my colleague by saying that his impression that he had complete control of the Air Service is wrong, because that is exactly what he did not have. The Air Service of the Army was one body and the naval Air Service was another body, the aircraft production board being a third body.

Mr. Fisher. But there were representatives of the Navy and the Army on it?

Mr. LaGuardia. Yes.

Mr. Fisher. And they claimed that their recommendations were followed by the War Department, while I now understood they were not followed.

Mr. LaGuardia. They did not agree amongst themselves on that board, because there was no one control.

Mr. Caldwell. Mr. LaGuardia, my recolection of the testimony of the chiefs of the Air Service of the Army is that——

Mr. LaGuardia (interposing). The testimony of whom?

Mr. Caldwell. Well, Gen. Squiers first, Gen. Kenly second, and Gen. Menoher third. All three of them testified——

Mr. Crago (interposing). I understood we were to hear Mr. Crowell and I think we ought to hear Mr. Crowell.

Mr. Anthony. Mr. Fisher directed a question to Mr. Crowell. Did Mr. Crowell answer it?

Mr. Fisher. Yes.

Mr. CRAGO. We are not concerned with responsibility now.

Mr. LAGUARDIA. That is a thing we want to go into later.

Mr. CROWELL. I should like to answer it more fully if I may. I wish to say in the first place that I was in the Ordnance Department during the early days of the war, until November, 1917, and that is why I can not state anything but hearsay matters in connection with that board. However, that board was an attempt to coordinate the air service in the War and Navy departments and it is exactly that attempt which we fear and are convinced will not succeed again because it had no semblance whatever of a separate air service. What we are trying to do now is to centralize the responsibility, and if there was ever divided authority it was in the workings of that board.

Mr. FISHER. I thought that board was fixed for that particular purpose.

Mr. CROWELL. As I recall, it had nothing but a sort of a veto power; it made recommendations which could be carried out or could not. As you know, we continually reorganized the air service until finally, before the armistice was signed, we got a single head of the air service under the War Department, but even then we had the Navy and the Marine Corps operating services of their own.

I will proceed with the statements of gentlemen interviewed by the mission:

Maj. Gen. Trenchard, R. A. F., chief of staff, Royal Air Force, said:

> Defense in two dimensions is comparatively simple; but for defense in the third dimension there is no real effective instrument but an air force capable of immediate contact with the enemy in the air, and able to defeat it—consequently an air force additional to the detachments used for the navy and army should be organized under a ministry independent of the other two services; for if this force is an appendage of either of the older services it will not develop its strategy and tactics along broad enough lines. However, such a force is always available for coordination with naval or military operations.

Sir Samuel Waring (well-known manufacturer of England) believes that a reasonable amount of money spent by the Government for encouraging commercial air activities would eventually give a far better return than the same amount spent on purely military or naval equipment.

In France, I had the honor of talking with Marshal Foch, who told me that the fact was clearly demonstrated in the present war that, if a nation is to conquer, she must have supremacy in the air.

Gen. Duval, Director of Military Aeronautics, said:

> If commercial aviation is not encouraged and stimulated, military aviation will die.

Since my return from Europe, and during the two months that have elapsed, I have studied most carefully the opinions as expressed by a number of gentlemen who appeared before your committee and who have opposed the centralizing of our air activities.

I have discussed this matter many times with Mr. Baker. I am sorry to say that he does not agree with me. But he has told me that, regardless of our difference in opinion, he is willing to have me present my views.

The one point which has been impressed upon me by much of the testimony is that lack of viewpoint from the bigger aspects of the matter. They seem to view it merely from its effect on their own

particular service and not from the broad viewpoint of the defense of this country and the vital necessity of creating this new weapon of defense to meet the other great powers on an equal footing.

I hope you gentlemen, in determining the future of this vital force in the defenses of the country, will give greater weight to the views of those who have made intensive studies of the subject than to the views of those who are so hampered by departmental interest.

It is not proposed by me to deprive the Army and Navy of any portion of control over the functions of air service deemed necessary to their operations, namely observation, photography, and direction of fire. But in the efforts to retain control over these functions, the most important feature of the future of the Air Service in general is missed. A separate department of aeronautics is a tactical necessity. In future wars it will have a function quite distinct from the conceptions of those who have so far expressed their disapproval of the plan.

Marshal Foch, Field Marshal Haig, and Ludendorf agree that before the mobilization of armies can be effected in the next war, a great conflict will occur in the air. The aggressive nation will be prepared to launch an attack upon the shipping, munition, manufacturing, and storage centers, and even the cities of its opponent. Unless the opponent is ready to meet or anticipate such an attack, vital victories will be early accomplished. It is only the nation that can clear the air of enemy forces that will be able to launch a campaign with its land and naval forces. With Europe only 16 hours removed from this country by air routes, we can not rest in fancied safety of isolation. It is only through the agency of a single responsible organization that we can confidently look to preparedness for such an eventuality.

The Government can not be asked to sustain by direct contribution the entire burden of keeping alive the aircraft industry. Commercial aviation must be encouraged to carry the greater part of the financial burden, not alone in meeting the requirements of aircraft production but also because of its equally important relation to the maintenance of an adequate reserve of aviators and mechanicians.

If commercial aviation is given a fair start by suitable governmental guidance and assistance, it will require only a few years to develop into a utility of real economic value; it is believed that eventually aviation will become one of the world's greatest transportation system. Great Britain, with splendid foresight, is evidently planning to take a lead with this utility that may be expected ultimately to place her in the same position in the air that she already holds in the remainder of the world's communication system—with her merchant marine, cables, and radio. It is well understood abroad that commercial supremacy in the air will mean much more than supremacy with a merchant marine, for the merchant ship can not be converted in a few hours into a ship of war.

In speaking of Government assistance to commercial aviation I do not mean that the Government should in any manner subsidize the industry. The best and probably most sought after assitance that can be given commercial aviation is the enactment of legislation necessary for the prevention of avoidable risks. Risks of life and property, the greatest detriment to commercial aviation development, are due to the following five causes:

(1) Faulty design or inspection of materials.
(2) Operation by incompetent pilots.
(3) Insufficient number of safe landing and starting places.
(4) Lack of information as to weather conditions.
(5) Collision.

It is realized abroad that all the above five causes can be almost completely eliminated through the agency of a suitable governmental organization, and that there is no other satisfactory means of avoiding unnecessary risk to life and property in commercial aviation. With the risk reduced to a minimum, the other two detriments to commercial aviation will eventually disappear; uncertainties in performance will be cured and durability of material improved in aircraft by carrying on the standardization work, the research work, and the experimental work on fundamental elements of design. Unless there are governmental research and test facilities and data accessible to the private individual only the few large corporations, who are able to maintain private laboratories, can make any real progress in new aviation design. In Great Britain, France, and Italy centralized organizations for technical development and the control of commercial aviation along lines to avoid these causes of risk of life and property listed above are already in effect or planned.

Mr. ANTHONY. May I interrupt you there?

Mr. CROWELL. Certainly.

Mr. ANTHONY. Are not all of the five propositions you lay down there for the development of aviation predicated, first, upon the development of an airplane that is of the highest type—one that is more practicable than any we have yet developed?

Mr. CROWELL. Yes.

Mr. ANTHONY. Is not that the primary consideration?

Mr. CROWELL. The aeroplane, as you know, has been developed during the war under forced draft and developed for military purposes; the element of safety has necessarily been disregarded, to a certain extent, while the element of speed and maneuverability has been accentuated, and the planes we now have all show that very plainly; and for commercial purposes we are going back to the factors of safety, which we have neglected in the development of planes during the war.

Mr. ANTHONY. The War Department is no further along now in its development of what it would call a permanent type of plane for manufacture than it was during the war, is it?

Mr. CROWELL. I would say it is no further along than it was at the conclusion of the war.

Mr. LAGUARDIA. On its own initiative it did not develop very much between April, 1917, and November, 1918, in this country, did it?

Mr. CROWELL. You mean by that, development in the War Department itself?

Mr. LAGUARDIA. Exactly

Mr. CROWELL. I think that is true. The development I am referring to is in commercial firms, which, of course, had contracts with the War Department and maintained large experimental forces at work during the war.

Mr. LAGUARDIA. True, but assuming that there was this development—still the War Department and the Navy Department did

not take advantage of it and they did not show any advancement from the time we entered the war to the time the armistice was declared, because all they produced, as you know, was the one type of motor and the one type of plane.

Mr. CROWELL. You are correct in saying that none of these had been gotten into production, that is, none of these planes.

Mr. ANTHONY. It is my understanding that out of the $25,000,000 we appropriated for aviation in the last appropriation bill there was to be approximately $11,000,000, if I am correct, used for development and production. Can you tell us if any of that money has been expended for production; and if so, what has been manufactured or is in process of manufacture—what types?

Mr. CROWELL. I will be glad to put that in the record, but I can not give it to you offhand.

Mr. OLNEY. In your statement you say that Europe is only 16 hours removed from this country by air routes. Can that be substantiated?

Mr. CROWELL. Oh, yes; that has been done.

Mr. FISHER. It is your conclusion that since the war the work in aviation has been practically at a standstill, as far as our Government is concerned, and that we must do something to rehabilitate it and put it on progressive lines?

Mr. CROWELL. We have certainly been at a standstill since the conclusion of the war. An air department would also look after the following:

(1) Liaison with other Governments on all international affairs in aviation, such as laws governing international air routes and air traffic; rules of the road; international codes for signals or other communication between one aircraft and another and between aircraft and surface stations; weather reports; international standards for charts of air routes, showing landing places, with their designating marks, and other necessary information for landing; international standards for day and night marks and signals for aids to navigation. It will be seen that most of the above are means of avoiding risks to life and property in aviation; they are those that help the air navigator in locating safe landing places, help him to avoid collision in the air and to avoid running into areas of unsafe flying weather.

(2) Planning commercial air routes throughout the country, also routes to and throughout the colonial possessions. This includes the selection of safe landing places, the preparation of charts and information—similar to sailing directions—suitable for use in aircraft, and the equipping of routes with standard marks, signals, and other communication systems required to facilitate their use.

(3) Promotion of the improvement of air routes; this to be effected by arranging for legislation or other procedure that will create new landing places and thus shorten the flying distance in a route; the first route established between two points will sometimes be considerably longer than the straight-line distance, owing to the necessity for making detours around large areas, where a safe landing is impossible.

(4) Preparation of regulations governing the use of all routes and landing places with a view to the avoidance of collision in the

air and on the ground. (In the future there will be a congestion of traffic on certain routes that will necessitate special lanes of flight and uniform procedure in getting into the air and landing.) Preparation of regulations governing flight over localities where accidents to aircraft involve risk to individuals and property on the ground.

Mr. McKenzie. I should like to ask you one question right on that point which you have brought out as to these additional landing places and greater facilities for the accommodation of the flyers. What is your idea about how that should be done? Do you anticipate that there will be corporations formed to carry on the transportation by flying machines and that they will look after that, or do you anticipate that the Government will take a hand in that and expend money, perhaps in the same manner as they do with regard to rivers and harbors; what is your idea about that?

Mr. Crowell. My notion is that a great deal of this will be done by municipalities. The War Department has been giving some attention to it and has found that most of the municipalities are ready and willing to establish landing fields. These fields should be standardized. There should be some governmental organization to see that the fields are large enough, that they are properly laid out, and I believe that they should be operated, if possible, under a perfectly uniform system. We have to-day nobody in the Government who can do that. In the War Department we have no authority; we have been working independently. The Navy Department has its own landing fields; the Marine Corps has its own landing fields; we have the mail, which has its own landing fields; and we have the Coast Guard, and also the Forest Patrol, which is operating successfully in certain parts of the West, guarding against forest fires, and there may be others. We are all working separately.

Mr. Sanford. And all spending money separately?

Mr. Crowell. Yes; and we are all spending money separately.

Mr. McKenzie. It would require legislation to bring about giving all of these different departments the right to use the landing fields and all the accessories?

Mr. Crowell. The items which I am mentioning are not covered at all by any governmental organization, and they are absolutely necessary.

(5) Supervision of all civil schools for training pilots, as regards methods and extent of instruction in preparation for qualification for flying licenses.

Mr. LaGuardia. The Department of Commerce is now claiming jurisdiction or asking for it?

Mr. Crowell. I think naturally they would be very glad to take it.

Preparation of physical, mental, and practical test requirements for all civil pilots and the issue and revocation of their licenses. This is the only sound method of avoiding incompetent piloting—one of the causes of risk to life and property.

Mr. LaGuardia. As the Chicago disaster proved?

Mr. Crowell. Yes, sir.

(6) Inspection of design and construction of all but Government types of aircraft as to their fitness for aerodynamical, structural, and mechanical safety in flight; issue of licenses for their opera-

tion. Periodic inspections of civil aircraft and issue of regulations for the purpose of insuring the proper care and preservation of aviation material and preventing its use when no longer in safe condition for flight. This is the only sound method of avoiding failures in material that may result in loss of control, collapse in the air, or fire.

(7) Research work and experimental and test work in all branches of aviation development that are along lines common to the military and naval aviation as well as to commercial aviation. Publication of technical facts and data that will be helpful to the aviation industry and to inventors.

(8) Cooperation with the aviation industry and scientific societies in the development of standards in quality of materials, in practices, and nomenclature; also, in so far as it will not stifle invention, the standardization of certain parts, fittings, and arrangements.

This character of work is being performed by air services abroad. In England it is already started; in France and Italy parts of it are started and plans are being made for the rest of it. Besides that, the Governments abroad are helping the industry in other ways; for example, all three Governments have provided military aviators and mechanicians for missions sent to other countries to demonstrate and advertise the product of the private manufacturers; such missions are now in South America and the Far East; in these projects the manufacturer is further assisted by arrangements with the Government for purchase at low prices of aviation material from the excess war stocks.

Much is being done abroad on aerial mail routes. Although the distances in Great Britain, France, and Italy inside the boundaries are not great enough to make aerial postal routes much superior in time saving to the railroads, a number of routes have already been established. In France, one route, Paris-Strassbourg, is being operated entirely with military aviation personnel and material for the purpose of gathering data in operating methods and costs. Also, at the time of one visit there was a commercial route in operation—Paris-Tille-Brussels. One member of the aviation mission flew over this route; he called our attention to the great value of all such routes as a means of training reserve pilots to complete familiarity with the appearance, not only of their own country, but also with the country of a possible enemy. One must actually fly across country in a strange place to appreciate the full value of this relation between commercial and military aviation.

It is a significant fact that the aeroplanes used in the French postal routes are capable of being changed quickly into day bombing machines; the receptacles for mail and parcels are so designed and disposed that they can be replaced by bomb racks without altering the flying balance of the aeroplane. This is not merely because it is an easy way to divert a war type already in production to commercial purposes, for similar provisions are incorporated in new designs built primarily for commercial use.

A separate air department has the following advantages:

It will save money through elimination of the duplication which exists under the present policy of having aviation developed under the Army and Navy.

As it is, we are providing two sets of technical men, two supply organizations, and two schools to teach even the beginning of flying. As a further important reason, the demand for specially qualified men for research and technical development are rare and their services should be made available for all the aviation work of the Government and not localized in the department to which they may belong.

It will also save delay—a factor vital in time of war. No machinery of joint boards or of liaison between services can possibly render the efficient service that would be derived in a single air department and departmental competition, which proved so harmful in the early days of the war, would be prevented.

Congressional investigation of appropriations can be centralized and the embarrassments that come from the present control by several committees on this subject will be eliminated.

It is proposed to unite in a single air department the following aviation activities:

(1) Aeronautic research and experimental work of the classes that have a general application in all organizations utilizing aviation, commercial as well as governmental.

(2) Supply of aircraft material for all governmental branches that use aircraft; this includes liaison with the aircraft industry that will permit the maintenance of plans for mobilization of the industry in time of war.

(3) General training, namely, that kind of practical and theoretical aeronautic instruction which is common to all branches of the Government employing aviation personnel.

(4) Supervision of all matters relating to commercial aviation which require Federal guidance and encouragement.

Under the head of the air department there should be the following four divisions charged, respectively, with the above four activities: (1) Technical, (2) supply, (3) general training, (4) civil aviation.

In addition to the above-mentioned divisions there should be organized in the air department an air force with two functions—raiding and fighting—these functions are specialized branches in air warfare that are distinctly different from the military and naval aviation specialties like reconnaissance, control of gunfire, etc. The pilots for this force need have very little Army or Navy knowledge and training and, therefore, it would be necessary to obtain only a portion of the officers for this force from Army and Navy personnel.

During the war both our Army and Navy had forces of this kind, although the Navy's force (northern bombing group) was organized on a comparatively small scale. But that duplication of effort certainly should not be repeated; the raiding and fighting force, for economy and efficiency, must be under one head; the reasons for placing this force under the Air Department instead of under either the War or Navy Departments are as follows:

(*a*) By assigning the air force to a department whose sole reason for existence is aviation, certainly better attention to its needs will be assured than if it were assigned to either the War or Navy Department where aviation can not escape being looked upon as an auxiliary.

The creation of a separately organized air force will offer an opportunity to such officers of the Army and Navy who desire to do so and who are suitable, to make this service their life's work. If this kind of an air force is not organized separately from the Army and Navy it can always be controlled by officers who are taking up aviation work as a temporary assignment (often with no real aviation knowledge, practical or theoretical), while the chief hope in their professional lives is the eventual command of armies or fleets. Certainly far better progress in the tactics of air fighting and raiding, and a far better esprit will be attained, if the controlling positions in this force are held by officers who have no thought for the future other than aviation.

(*b*) In time of war the personnel of this force must be rapidly expanded to comparatively enormous proportions. We must look to commercial aviation for the personnel for this increase. The air force, through the air department, which licenses civilian fliers, will have a better liaison with the source of reserve pilots that could be effected by any existing machinery in the War or Navy Department organizations.

(*c*) A very large proportion of the aeroplanes that will be used for commercial purposes will be suitable for conversion into raiding types. As the air department will certify all commercial aeroplane designs prior to their use, the air force, through the department of which it is a part, can properly guide this design along lines that will make these types immediately convertible into war material.

It is unfortunate that an air force of this kind is frequently called an independent force; the word "independent" is often construed as meaning that this force, in time of war, would be a sort of free lance. As a matter of fact it should be independent only in its organization, administration, discipline, and in its tactical development, precisely as the Marine Corps is independent of the other fighting service. It may, and doubtless will, engage in independent war operations especially prior to mobilization of the Army or Navy, but it would cooperate with either the Navy or Army in the same manner that the Marine Corps supports the strategy of that arm which requires it.

In order to keep the technical division in constant touch with the needs of the Army and Navy, it is suggested that flying officers from these two services should be detailed for service with this division. Similar details should be made from the air force to the technical division. This division should also be prepared to carry out special research and experiment at the request of any other department using aircraft.

It will be the duty of the supply division to act as the organization for supply of aircraft material for any department authorized by Congress to acquire aircraft. Provision should be made for the detail to this division of representatives of each department to aid in understanding and filling the needs of their services. Actual production of planes and motors will be carried on almost entirely in private establishments, in order to encourage competition and to give a broad basis for a greatly enlarged supply in case of war.

It is recognized that most of the ground training of a flier and a part of his training in the air are of the same character, whatever the ultimate nature of his duty. So far as this training is common

to the various departments, it will be obviously a saving of money and effort to have it under one control and thus prevent duplication both of organization and of physical facilities. In order to secure the fitness of this training to the ends to be reached it is suggested that in this division officers of the air force be detailed for service as instructors.

Under the division of civil aviation should come not only the control of civilian flight within the national boundaries but the whole field of international flight, including such administrative action as may be needed to put into force the provisions of the international convention, should that be ratified. It will be to this division that foreign aeronautical authorities and foreign nationals wishing to fly across our boundaries will be directed for information. The making of maps, the control of aerodromes, the establishment of rules of the air, inspection and other provisions for safety, and the publication of information will be among its duties.

The foregoing plan is suggested as meeting the existing difficulties of loss of motion between the various air activities and lack of central authority to control and administer the whole subject of air transport in the United States. It should be emphasized that activities of such enormous importance for the future, and of such necessity for the present plans for national defense, should not be hampered or crippled by division of authority among several departments, or (which would be still more harmful) obscured and neglected by being intrusted to a mere bureau of an existing department.

As the proposed air department will have as one of its most important functions the supply of material to several great departments, such an arrangement is perfectly logical; and the plan of creating for the purpose an independent office is supported by the precedents of the Shipping Board and the Interstate Commerce Commission.

Mr. LAGUARDIA. Mr. Secretary, will you include the report of the American aviation mission as an exhibit to your statement?

Mr. CROWELL. Yes, sir.

(The report of the American aviation mission, refered to by Mr. LaGuardia, follows:)

EXHIBIT A.

REPORT OF AMERICAN AVIATION MISSION.

[Consisting of Hon. Benedict Crowell, the Assistant Secretary of War; Howard E. Coffin, member of Council of National Defense; Henry C. Mustin, captain, United States Navy; Halsey Dunwoody, colonel, Air Service, United States Army; James G. Blair, jr., lieutenant colonel, General Staff, United States Army; George H. Houston, president Wright-Martin Airplane Corporation; C. M. Keyes, vice president Curtiss Aeroplane & Motor Corporation; S. S. Bradley, general manager Manufacturers' Aircraft Association.]

JULY 19, 1919.

To the SECRETARY OF WAR.

SIR: In accordance with your instructions, the American aviation mission visited France, Italy, and England. It was able to confer with various ministers of these Governments, ranking army and navy commanders, and the foremost aircraft manufacturers.

A thorough study and investigation was made by your mission of all forms of organization, production, and development. As a result of these studies your mission desires to emphasize the universal opinion of its members that immediate action is necessary to safeguard the air interests of the United States, to preserve for the Government some benefit of the great aviation expenditures

made during the period of the war, and to prevent a vitally necessary industry from entirely disappearing. Ninety per cent of the industry created during the war has been liquidated. Unless some definite policy is adopted by the Government, it is inevitable that the remaining 10 per cent will also disappear.

In placing this matter before you the subject falls into three important heads: (1) General organization; (2) Development, commercial; (3) Development, technical.

I. GENERAL ORGANIZATION.

The findings of the American aviation mission and its recommendations are submitted after a careful review of the situation in the allied countries mentioned, but always keeping in mind the situation in the United States. Under the above subheads the results of these investigations are presented to you, which, in the opinion of the mission, demand the most earnest and immediate consideration along the broadest lines, with a view to establishing some fixed policy which will save the aircraft situation in the United States and give the United States an equal place with the great powers of Europe in this great new commercial development.

The American aviation mission therefore recommends the concentration of the air activities of the United States, military, naval, and civilian, within the direction of a single Government agency created for the purpose, coequal in importance with the Departments of War, Navy, and of Commerce, to be called in this report, for the purposes of identification, the National Air Service.

In making the above recommendations, the following views and data of the mission are presented:

Visits were made by the mission to England, France, and Italy and conferences have been held with those largely responsible for the successful prosecution of the war and especially with those men most experienced in the aerial development within those countries. Among others, interviews have been had with:

France: Maréchal Foch, Commandant-en-Chef des Armées Alliées; André Tardieu, Ministre des Affaires Franco-Américaines; Général M. Duval, Chef de Service de l'Aeronautique; Jacques Dumesnil, Deputé, formerly Sous-Secrétaire de l'Aeronautique; M. Loucheur, Président du Conseil de Guerre, now Minister of Reconstruction; Daniel Vincent, Deputé, formerly Sous-Secrétaire de l'Aviation; Gaston Minier, Deputé, Chef du Comité Aeronautique au Senat; and Major d'Aiguillon, of the Commission Interministerielle de l'Aviation Civile.

England: Hon. Winston Churchill, M. P., secretary of state for war and secretary of state for air; Field Marshal Sir Douglas Haig, commander in chief of the British Army; Admiral Sir David Beatty, R. N., admiral of the fleet; Maj. Gen. Right Hon. J. E. B. Seely, under secretary of state for air; Maj. Gen. Hugh M. Trenchard, chief of air staff, Royal Air Force; Maj. Gen. E. L. Ellington, director general, supply and research, Royal Air Force; Maj. Gen. Sir Frederick H. Sykes, controller general civil aviation, Royal Air Force; Sir. W. A. Robinson, secretary, air ministry; and Maj. Gen. Sir. W. S. Brancker, Royal Air Force, now with the Aircraft Manufacturing Co. (Ltd.).

Italy: G. Grassi, chief of the Italian aviation in Paris; Col. Guidoni, Italian foreign aeronautical mission; Admiral Orsini, chief of Italian naval aviation; Col. Crocco, chief of the technical bureau; and Signor Conti, secretary of state for aviation.

In all countries visited, and in the minds of all persons met in conference, appears an extraordinary similarity in condition and in conclusions drawn from the experiences of the five difficult years of mistake and achievement in the prosecution of the war. Perhaps no stronger or more simple presentation of the regard in which the future of aviation is held in allied countries can be given than by quotation from two letters of M. Clemenceau, copies of which were obtained in France. The first is addressed to the President of the United States, urging upon him the immediate consideration of matters aeronautical and in connection with the peace conference. The second is addressed to the President of the Republic of France, submitting the draft of a decree creating a separate department of aeronautics placed transitorily under the ministry of war—an intermediate step possible without legislation and looking to the early creation of an independent ministry of the air:

LETTER FROM M. CLEMENCEAU TO PRESIDET WILSON.

FEBRUARY, 16, 1919.

The president of the council and the president of the interallied peace conference to the President of the Republic of the United States interallied aviation committee.

MR. PRESIDENT: I have the honor to acknowledge the receipt of your answer of February 7 to my letter of January 24. I inclose herewith copies of the letters which I have received from Lord Milner and from Monsieur Orlando, as well as my replies.

I am pleased to note that you agree in principle with my proposition to create an aviation committee for after the war. I take the liberty of insisting on the necessity of creating this committee without delay, in order to be able to utilize it as an advisory organ for the peace conference. Indeed, the clauses for aerial protection seem to have at least an importance equal to the clauses for military and naval protection; and it is of the greatest interest to have a study made by competent personalities of the measures to take against the eventual constitution of a German military fleet. I can not insist too strongly on the imperious necessity of this study, on account of the proximity of Germany to London, Brussels, Paris, and Rome.

Likewise I adhere entirely to the British proposition which seems to me practical and effective, and I request you likewise to give it attention. In case it seems acceptable to you, I wish you would let me know if you could delegate two representatives to the next meeting of the new interallied committee, which will take place on Thursday, March 6, at 10 o'clock, at the Directory of Aeronautics, 260 Boulevard St. Germain.

Please accept, Mr. President, the assurance of my highest consideration, etc.

(Signed) CLEMENCEAU.

REPORT TO THE PRESIDENT OF THE FRENCH REPUBLIC.

PARIS, *June 6, 1919.*

MR. PRESIDENT: Aircraft has developed considerably during the war. It should at this time adapt itself to a no less important part in peace time. But because of the many initiatives which cooperate in its new use and development, the efforts and means are dispersed in various ministerial departments.

The future aviation in France will only be assured by the coordination of all efforts and the unification of the general services. Also, it will give the advantage of better work from the personnel and credits which are actually effected to similar objects in different ministries.

With this object in view, and according to the propositions of an interministerial conference which I am able to assemble, I have the honor to submit for your signature the following decrees creating an organ of general coordination of aviation.

This should not be confused with any of the particular aviations of the various ministerial departments. At its origin it will be attached transitorily to the ministry of war.

I am, sir, yours, respectfully,

GEORGES CLEMENCEAU,
President of the Council, War Ministry.

Even before the report of this mission can be given consideration, a step similar to that proposed by France will have been taken by Italy. Here, however, the department of aeronautics is being placed under the ministry of transportation—a makeshift arrangement frankly acknowledged transitory and immediately possible without the legislation needed to create the clearly foreseen ultimate—the Italian ministry of air.

England more than two years ago began the coordination of her aircraft activities—an effort which has resulted in placing her well in the lead in practically every phase of aerial development and which has resulted in bringing her months ago to the establishment of a ministry of air, coequal with her ministries of war and of the navy. That the present ministries both for war and for air are centered in the same individual has no significance other than that of momentary expediency.

The whole trend of events touching the art of aeronautics in its broad relation to world progress, the experience in all allied countries (including the

United States) during the five years past, the frankly discussed future plans under present consideration in foreign quarters and the views everywhere encountered by us, leave your mission impressed with these inescapable conclusions:

1. That Italy, France, and England realize fully the importance of aircraft in the military-naval and civil-commercial aspects and propose to encourage the general development of the art through governmental aid to commercial industry.

2. That Great Britain has come to consider the dominance of the air as at least of equal importance with that of the seas, and is frankly and avowedly planning a definite policy of aerial development to that end.

3. That any future war will inevitably open with great aerial activity far in advance of contact either upon land or sea, and that victory can not but incline to that belligerent able to first achieve and later maintain its supremacy in the air.

4. That for economic reasons, no nation can hope in time of peace to maintain air forces adequate to its defensive need except through the creation of a great reserve in personnel, material, and producing industry through the encouragement of civil aeronautics. Commercial aviation and transportation development must be made to carry the financial load.

5. That no sudden creation of aerial equipment to meet a national emergency already at hand is possible. It has been proven within the experience of every nation engaged in the war that two years or more of high pressure effort have been needed to achieve the quantity production of aircraft, aircraft engines, and accessory equipment. The training of personnel, including engineering, production, inspection, maintenance, and operating forces—covering some 50 distinct trades and some 75 industries—has proved in itself a stupendous task when undertaken upon the basis of the war emergency alone.

6. That the rapid adaptation of aircraft to the commercial uses of peace is everywhere being studies and planned. Under the forced draft of war, this newest and fastest agency of transportation has been brought to a high state of development. It must now be redesigned to meet the progressive demands of a civilization at peace.

7. That because of its great speed and range of operation, oceans, States, and even countries are being passed over with a greater facility than are townships and counties traversed by the motor car. The need for international agreements governing the construction, operation, and safety of aerial apparatus of all kinds is immediately before us.

8. That for the first time in the world's history the stage is set for a close international cooperation in the development of a great art at the very threshold of its era of commercial utility. Great Britain, France, Italy, and Japan not only invite but urge the United States to share in this work.

9. That just as we now have national, international, and interstate regulations, laws, and agreements covering rail and steamship travel and the safety and navigation of the seas, so must we have similar regulations governing aircraft and the uses of aerial navigation throughout the world. The international committee sitting in Paris, under the peace conference, gives the first long step in this direction.

10. That the need in each country for a single authoritative point of contact for the conduct of all international aviation affairs, legal, operational, technical, and political, is imperative. Such agencies have already been set up in England, France, and Italy. The United States has under the terms of the international convention no option but to follow these leads.

11. That in England, France, and Italy sentiment is undoubtedly in favor of the centralization of aircraft development under one authoritative head. Difference of opinion has been encountered only in the matter of Army and Navy personnel and in the question of the independent fighting force.

England holds the initiative and is building her royal air force coequal with the army and navy. France and Italy follow England's lead, but seem inclined to leave questions of operating personnel for the present to war and navy departments, and to debate the need of an independent fighting air service. In all cases forces operating in conjunction with military and naval units, function under the military or naval high commands.

12. That among the many considerations of early moment requiring governmental direction may be mentioned the following:

(*a*) Federal and international laws governing the use of air routes.

(*b*) Federal and international control of pilots' licenses; examination and tests required.

(*c*) Federal inspection of all commercial aircraft for airworthiness or suitability for service.

(*d*) Customs and other regulations for crossing State and National boundaries.

(*e*) International standards for methods of communication and signaling.

(*f*) International standards covering the marking or charting of air routes and of landing places for both day and night use.

(*g*) International specifications and rules governing the construction, equipment, and operation of standard airdromes, landing stations, signal towers, and other aids to aerial navigation.

(*h*) Port regulations and fees covering seaplanes.

(*i*) Federal taxation of aircraft and license for its use.

(*j*) Safety measures and devices; legislation forcing adoption.

(*k*) Fire-underwriter standards, regulations, and safeguards; insurance of machines, of material, and of persons in transit (property and life).

(*l*) The legal status of privately owned aircraft; the property rights of the air; liability for damage inflicted and incurred.

(*m*) International standards and specifications covering accepted practice in quality of materials, in factors of safety, and in methods of construction; an engineering literature of the new art must be created by international approval.

(*n*) Maps and navigation charts of the United States and its Territories.

13. That we of to-day are conceivably no more qualified to judge as to the scale and development of the aircraft of 10 years hence than were we of even 5 years ago able to foretell the achievements of to-day. We must bear in mind always that for every one mind focussed upon things aeronautical in this earlier period, some thousands of keen minds are now versed in the aircraft art. With proper governmental encouragement, rapid progress seems inevitable.

14. That the broadest consideration for the ultimate welfare of American aviation must be given in the constitution of any organization set up for the coordination and control of aeronautics within the United States. The prerogatives and ambitions of governmental departments and of individuals must be assayed at true value.

15. That past experience and every economic consideration point to the vital need for the formulation by the United States, of a definite, comprehensive, and continuing policy for the development of every phase of the aircraft art. Our Government is now faced with the task of nursing and actively encouraging a new transportation industry, whose healthy growth is vital to the future progress and defense of the Nation.

Because of the lack of a definite, intelligent, and sympathetic policy in our governmental aircraft organization since the armistice, our American aeronautical industry, built up at such great expense of money and of effort, is rapidly disappearing. No sensible business man is justified in keeping money invested in the aircraft industry under the conditions which have maintained in the United States since November 11.

16. That the closest possible relations must continually exist between the aircraft agency of the Government and the production and commercial industry engaged in aircraft development.

17. That the industries involved in the production and commercial use of aircraft must be given recognition and representation in connection with all national and international activities bearing upon the direction and control of aeronautics.

In the foregoing brief presentation of its conclusions, your mission has touched upon the aeronautical policies already in effect or under present discussion in England, France, and Italy. Great Britain's plan of organization certainly warrants our most careful consideration. Its salient points are clearly set forth in the chart herewith attached. It is not argued that the British method is perfect, but it can be stated without fear of contradiction in any quarter, that it stands to-day the most comprehensive governmental mechanism yet set up by any nation in the world for the encouragement, upbuilding, direction, and control of its air resources. This organization has been born of five bitter years of trial, mistake, experience, and progress. It is the product of the best brains in the British Empire focussed under the spur of national need and the demand of the British people. We in America may well study it carefully.

Your mission, in presenting its recommendations, desires to emphasize the view everywhere encountered that the future of aerial navigation and of aerial development generally, is in only a limited sense a function of military and naval establishments. The air is a medium for commerce and communication and its direction to the peaceful uses of civilization must be unhampered by the necessarily restrictive views of these specialized departments.

RECOMMENDATIONS.

(A) The concentration of the air activities of the United States, civilian, naval, and military, within the direction of a single governmental agency, created for the purpose coequal in importance and in representation with the Departments of the War, Navy, and of Commerce.

(B) That the agency thus created be charged with full responsibility for placing and maintaining our country in the front rank among nations, in the development and utilization of aircraft for the national security, and in the advancement of the civil aerial transportation and communication arts.

(C) That this governmental organization be formed in general as follows:

First. A civilian secretary for air.

Second. An assistant secretary, a civilian, responsible directly to the secretary for air, for the management and operation of the department.

Third. Five or more divisional heads acting as chief of the subdepartments of (*a*) civil aeronautics, (*b*) military aeronautics, (*c*) naval aeronautics, (*d*) supply and research, (*e*) finance, etc.

Fourth. An air council, advisory in character, which shall be constituted by the secretary of air, including the assistant secretary of air, the chiefs of the several subdepartments, and such other personnel as may be deemed advisable.

We desire especially to invite attention to the complexity and newness of the whole development of the aviation art, and to urge the broadest possible treatment of the subject during this formative period. We suggest that the lesser details of organization may well be left to the judgment and initiative of those called to assume the responsibility of directing this work. We desire also, in this connection, to call attention to the aircraft interests of the allied Governments, and to emphasize the necessity for careful discrimination in the selection of men of industrial experience and broad vision.

(D) The establishment of governmental institutions of education and training, including an air college, all open alike under proper restriction, to military, civilian, and naval personnel.

(E) Such curricula and such arrangement of promotion in the national air service, and such assignment and pay as to insure to the young man an attractive career whether he elect to remain permanently in the "national air service" or return to Army or Navy, or to civil life .

(F) The adoption of a system whereby Army, Navy, and civil personnel can be circulated in proper proportion through the national air service. This personnel would, unless permanently assigned to air work, be automatically returned to the military and naval sources, or to civil life as an air service reserve after the educational and service periods in the national air service have expired.

It is felt that such a circulating system is vital to the coordination and ultimate efficiency of the three services and to the desired dissemination of a knowledge of and interest in the air among our people. The young officers of to-day will command the military and naval forces of to-morrow, and will carry with them into the highest ranks an intimate knowledge of aircraft, and of the strategy of its varied uses, in connection with operations on land or sea. The direction of civilian and commercial activities of all kinds will be made possible, and the closest contact and cooperation between the Government and the aeronautical industries assured.

All international relations touching aerial matters fall naturally within the jurisdiction of the secretary for air.

All responsibility for the supply of aircraft material and equipment of all kinds and for the training of personnel for all branches of the service is, in accordance with these recommendations of your mission, placed with the secretary for air. As some 27,000 items are involved in the equipment and maintenance of each air squadron on active duty, the need for a single responsible direction seems undebatable.

Upon the plan of organization here recommended, all squadrons and all equipment assigned by the national air service to meet the stated requirements of the

Military and Naval Establishments, pass automatically under Army and Navy command. Under national air service operational direction remain only those independent projects unrelated to the activities of the military and naval fighting fronts and such personnel and equipment as forms a surplus to the needs of the sea and land fighting arms.

The question of governmental organization for the development and utilization of our country's air resources has been given consideration by your mission, seemingly from every angle. The recommendations made are general. No report could be made effective if burdened with the mass of details involved in the setting up of any governmental mechanism such as proposed.

There has been and will continue to be advanced many objections to the establishment of a department of the air. We believe none of them prove insurmountable. We believe the advantage gained to be such as to entirely overshadow any temporary difficulties.

Always in the past, in war by land or by sea, and in the transportation activities of peace, we have thought in two dimensions only. We must now readjust our minds to think for all future time in three.

When this mission left the United States in May its members thought the Atlantic Ocean might be crossed before January 1, 1920. Within three months of our absence four successful crossings have been made, and without the loss of a single life.

There must be no overoptimism. There are years of development and experimentation ahead. As in the case of all the other great agencies of civilization. the commercial and financially profitable use will come slowly. But here the immediate welfare and safety of our Nation is involved and an intelligent and efficient direction of our aeronautical affairs will be demanded by the American people. American genius has given to the world the airplane, a new instrument of commerce and of war. But America has left its development to other nations and too late realized the mistake of this neglect. She has paid the price! America now again has the opportunity, if not to lead at least to take her place in the front rank and to gain to herself the full benefit which will surely accrue from an active and sincere cooperation in the engineering activities and in the scientific and commercial aircraft developments of those nations associated with us in the war.

But this will be impossible, in the future as in the past, if our aircraft activities remain dispersed among the several governmental departments and impossible of coordination for decisive action.

Upon the breadth of view and the vision of those in control of America's policies depends our future as an air power.

II. COMMERCIAL DEVELOPMENT.

With reference to the commercial development of aviation your mission makes its recommendation based upon the following conclusions which have been formed, first, through knowledge of conditions existing at present in America, and, second, the knowledge gained by its investigations abroad.

The investigations in England included visits to a number of factories, airdomes, and other points of particular interest, and interviews with the following gentlemen:

England: Maj. Gen. Hugh M. Trenchard, K. C. B., D. S. C., chief of staff, air ministry; Maj. Sir Frederick H. Sykes, K. C. B., C. M. G., controller general, civil aviation; Maj. Gen. E. L. Ellington, C. B., C. M. G., C. B. E., director general supply and research; Gen. Huggins; Douglas Vickers, Vickers Co. (Ltd.); Capt. P. D. Ackland, Vickers Co. (Ltd.); Sir Percy Gerouard, Armstrong, Whitworth & Co.; Sir Samuel Waring, of Waring & Gillow, who is also interested in five other aeronautical companies in England; Holt Thomas, Aircraft Manufacturing Co.; Gen. Sir W. S. Brancker, K. C. B., D. F. C., Aircraft Manufacturing Co.; White Smith, British & Colonial Airplane Co.; J. A. Taylor, Cosmos Engineering Co.; Fadden, Cosmos Engineering Co.; Handley Page, Handley Page Co. (Ltd.); Graham White, Graham White Co.; C. V. Allen, secretary of the Society of British Aircraft Constructions; and Leslie P. Langton, Black & Manson Insurance Underwriters, who have specialized in aircraft insurance.

Members of the mission also visited the airship factory of Armstrong, Whitworth & Co., located at Selby, and the dirigible airdrome of the British Navy located at Pulham, where they examined the *R-33*, which is a replica of the *R-34*, and several smaller airships.

The mission's investigation in France included visits to a number of French factories and flying fields and interviews with the following gentlemen:

France: Gen. M. Duval, directeur du service aeronautique; Senateur Gaston Minier, chef du comité aeronautique au senat; Pierre Etienne Flandin, deputé, formerly chef de l'organe interallié de l'aeronautique; Commandant d'Aiguillon, of the commission interministrielle de l'aviation civile; Commandant de St. Quentin, chef du service de fabrication de l'aviation; Louis Breguet, of the Breguet Co. and Compagnie des Messageries Aeriennes; Bleriot, of the Bleriot Co.; Maurice Leblanc, Bleriot Spad Co.; Kaherer, Société Astru; Bazaine, Société Nieuport; Maurice Farman, of the M. & H. Farman Co.; Granet, secrétaire du chamber syndicale de l'industrie aeronautique; Esnault-Pelleterie, président du chambre syndicate de l'industrie aeronautique; Lieut. Réné Fonck, premier French ace; Maurice de St. Blanchard, secretary of the Aero Club de France; and Comte de Libersee, former pilot and at present much interested in the development of civil aeronautics in France.

Among the factories visited were: Morane-Saulnier, Breguet, Bleriot, Farman, Hispano-Suiza, and Renault, all of which are engaged in the manufacture of airplanes and motors.

The investigation in Italy included interviews by representatives of the mission with the following gentlemen:

Italy: G. Grassi, deputy, ex-chief of the Italian aeronautical mission in France; Col. Guidoni, Italian foreign aeronautical mission; Admiral Orsini, commander of Italian aviation; Capt. Bursaglia, chief of staff to the minister of marine; Peroni, director of the Ansaldo Co.; Casatti, of the Caproni Co.; and Buzio, of the Macchi Co.

Representatives of the mission also visited the following factories in Italy, all of which are engaged in the manufacture of airplanes, balloons, and motors: Pomilio Co., Ansaldo Co., at Torino; Caproni Co., at Milan; Isotta; Franchini, which was shut down due to a strike.

1. One of the most important problems to be considered in the rehabilitation of the world's commerce following the close of the war is the development of aerial transportation for commercial purposes. Its one invaluable service, and that in which it surpasses all other means of transportation, is speed, that time-saving element which the world has always striven for and for which America, with its great distances, has such serious need. Reliability, safety, economy, and those other qualities of transportation service which are of value will steadily improve as the use of aircraft increases and experience accumulates.

2. It is as impossible to forecast the future of this new medium of transportation as it would have been to describe the speed, comfort, and safety of the modern steamship at the time the first steamship crossed the Atlantic. It is safe to say, however, that in time it will become one of the great transportation mediums of the world and will continue to offer the fastest and most direct means of transportation for persons, mail, and light freight known to civilization. Its development is limited only by the perfection of the mechanical devices used, with which we are constantly becoming more familiar, and by the extent of our knowledge of the atmosphere, which is becoming more thoroughly understood each year.

3. It is equally difficult to determine the speed with which this development will take place. In fact, this will be determined largely by the opportunities afforded to employ the brains of the engineer and the scientist on the problems involved, which in turn will be controlled by the financial resources available for such work. It is thought by some well-informed authorities that the next 5 or 10 years will see this new industry through its initial stages and established on a self-supporting basis, providing it is encouraged at this time. Adequate support can not be expected from private enterprise alone, and if no outside aid is given, 10 years will probably see this industry in America still struggling for a foothold and far behind its European competitors, who will receive substantial aid of many kinds.

4. History has shown repeatedly that no nation can afford to neglect the highest possible development of its transportation mediums regardless of the opportunities existing for immediate profit to the private enterprise concerned. This is particularly true of aerial transportation, which is not local in its nature, but which is essentially of a national and international character, due to the great distances covered and to the speed with which it links together far-distant points. This principle has been so clearly understood that an inter-

national agreement has been established between the Allies and their associates by which international flight of aircraft has been provided for in a farsighted manner, thus making immediately possible the flight of private craft from one country to another on a basis as clearly defined by law as that governing the movement of steamships, except, of course, that the practice of ages of ship travel is missing in the case of aircraft.

5. The development of aviation is progressing so rapidly at this time that it is difficult even for those in close touch with it to keep up with its progress. During the past two months the Atlantic has been crossed four times by aircraft; first, by a seaplane of the American Navy; second, by an airplane of Great Britain; and finally by an airship of Great Britain which has twice demonstrated its ability to fly between England and America. All of this has been accomplished without the loss of a single life. Airships are now building in England which will be able to carry from 5 to 10 tons of mail, in addition to the necessary fuel and crew, and cross the Atlantic from London to New York in one-half the time made by the fastest steamships. Who can say such transportation facilities will not greatly serve civilization and be of immeasurable value to our own country if properly developed and used?

6. Already lines of aerial transportation are being used in England and France in a small way for commercial purposes, but the distances in these countries are so short that relatively little advantage can be gained, so such ventures will develop slowly. A daily service from London to Paris has been in operation for some time, and promises to be quite serviceable as soon as it can be relieved of its war-time military supervision. Other lines now in operation are from Paris to Lille and Brussels and from Paris to various points in Alsace-Lorraine and German-occupied territory. Among other plans English private interests are projecting airplane lines from Cairo to the Cape and Cairo to Bombay, and French interests are planning to run a line to Algeria and Morocco. These lines will carry mail, passengers, and express, and it is expected that they will materially shorten the time between European centers and their far-distant terminals. The United States Post Office Department has carried mail by airplane from New York to Washington for over a year with a record of nearly 100 per cent delivery at each end every day. It is now inaugurating a line from New York to Chicago which will shorten the mail time between these two points to about one-half. It is also projecting a two-day service from New York to San Francisco. England is already desirous of organizing with the United States a trans-Atlantic airship line for mail service which would give a five-day mail service from London to San Francisco. Such a service is entirely possible at this time, and its inauguration depends only upon adequate encouragement and financial support.

7. The risks involved in these ventures, due to unknown conditions of the atmoshere, imperfections of equipment, etc., are still so great as to make them impracticable from the point of view of private enterprise, undertaken for a profit. If left entirely to such private enterprise, aerial transportation will develop slowly and with many losses and backward steps, as did the steamship, the railroad, and the automobile, each of which, however, has ultimately become a vital factor in our civilization.

8. One of the striking features of our investigation in Europe was the unanimous belief that the use of aircraft in warfare and for national defense would continue to increase and that in the next war, whenever it might come, aircraft would be a far more vital factor even than it has been in this war. One of the greatest military authorities in Europe stated that in his opinion the first battle of the next great war would be in the air, and would very nearly decide which side would win, in that the side winning in the air would immedately have access to all of its enemy's sources of supply and production, and would quickly cripple them by air raids upon an enormous scale. The opinion was everywhere expressed that the development of aircraft for purposes of national defense must continue and that sufficient flying and production facilities and personnel must be maintained at all times to insure an adequate supply in case of need. Due to the complicated and delicate nature of such equipment, to its rapid depreciation in use, and to its constant obsolescence, the expense involved in such a program would be very great, in fact, almost prohibitive in peace times.

9. The existence of an aerial transportation industry with a great commercial air fleet and of a strong production industry would greatly decrease the need for strictly military equipment and resources in that practically all of the aircraft and landing-field facilities and personnel, and the manufacturing and

maintenance facilities and personnel employed by such commercial activities, would be available as a reserve in time of war. It is evident, therefore, that the most economical way to develop a strong air service for national defense is to encourage by every means possible the use of aircraft for commercial purposes, and thereby build up a commercial fleet at relatively small expense to the Government, which would effectively supplement its strictly military equipment in time of need. America's experience during the war has proven conclusively that aircraft facilities and personnel, and particularly production facilities and technical personnel, can not be obtained upon short notice, but only by long and continued experience and at great expense.

10. America's production industry reached large proportions during the war, but since the signing of the armistice it has shrunken to a very small volume. Unless immediate attention is given to its conservation, it will practically disappear, and a considerable portion of the great sums expended in its development will have been spent fruitlessly. This industry does not require a large volume of business to keep it alive and healthy, but it does require a steady and dependable demand, otherwise private capital and enterprise will not long remain interested.

RECOMMENDATIONS.

Upon the basis of these conclusions, we offer the following plan for stimulating the development of commercial aviation as an aid to national defense and as a response to the demand that is already developing for improved commercial transportation through the use of aircraft.

(A) The civil aviation division of the national air service should establish with the advice of the Army and Navy, and the division of military and naval aeronautics, a series of flying routes throughout the United States and its possessions and to contiguous foreign countries, which will be of military and commercial value. It should also prepare and publish maps and descriptions of each of these routes, suitable for the use of fliers.

(B) There should be provided at national expense certain flying fields in strategic locations, and suitable for military purposes, and encouragement should be given to the various States and municipalities to provide flying fields upon all flying routes, at points found desirable, thus eliminating the necessity for private ownership of flying fields except for strictly private use. Hangars should be provided at each flying field by the governmental authority owning the field—that is, Federal, State, or municipal—or where such fields are used constantly by private interests, they should be permitted to provide their own hangars immediately adjacent to and opening upon such flying fields.

The operation and use of such flying fields should be controlled by Federal law, so as to obtain uniformity throughout the Nation and conformity with international regulations.

(C) All flying routes and flying fields should be equipped at national expense with signalling and communication systems, including wireless telegraphy, wireless telephony, and searchlights, to thoroughly safeguard and guide aircraft in flight. The Government's attitude in this matter should be the same as that maintained toward shipping in its lighthouse and coast-patrol service. The operation of signalling and communication equipment should be controlled by Federal law for the reasons indicated under item (B).

(D) A meteorological service should be developed to provide fliers and other aviation interests with accurate weather reports and other atmospheric data necessary to govern their activities intelligently. The value of this service to commercial aviation can not be overestimated as it will go far toward establishing reliability and safety of service, just as weather reports are of immeasurable value to ocean and lake transportation.

(E) Training facilities should be provided at various localities throughout the country, either at Government expense, or by private enterprise under Government regulation, with guaranties from the Government of a sufficient number of students to cover expenses. Such guaranties could be given by the Government without undue expense if it used such school for the preliminary training of its military personnel. Such a plan would encourage private enterprise to provide facilities for the training of the personnel needed for commercial requirements, which personnel in turn should become a permanent reserve for military requirements in time of need. There should be established at least one school for the teaching of aerodynamics and other branches of the science of aeronautics as recommended under the heading "Organization."

Encouragement should be offered to universities throughout the country to establish departments of aeronautical science.

(F) The Government should encourage the development of new design and aeronautical technique for commercial purposes along the lines recommended under the heading "Technical development."

(G) The department of aeronautics should maintain the closest possible relations with all civilized nations in determining and applying the rules and regulations which will govern the international use of aircraft, and there should be developed as rapidly as is consistent with proper consideration, a body of Federal law governing the use and airworthiness of aircraft for commercial purposes, which will safeguard life and property, and promote the commercial usage of aerial transportation. In order that commercial aviation may be helped and not hindered by such legal restrictions, it is of vital importance that aerial transportation be recognized at once as an element of interstate commerce and be made subject to one body of Federal law applying uniformly throughout all of the United States. It will thereby avoid the complications of individual State control which have proven to be such a handicap to railroad and automobile operation.

(H) Insurance of aircraft and its personnel against all kinds of hazards and risks involved should be encouraged in every way. The cost of such insurance should be kept as low as is consistent with the risks involved.

(I) Encouragement should be given to the organization of private enterprises for carrying on aerial transportation. This encouragement might well be in the form of payment for the carrying of mail and expressage, and of guaranties as to the volume of such business. Compensation might be paid to such enterprises for keeping their facilities available for use in time of war. Guaranties of this kind coupled with opportunity to insure against loss by accident should make privately operated transportation lines a commercial possibility, but if it is found that private enterprise does not respond to such encouragement, then the Government should undertake certain transportation ventures on its own accoun and should continue to operate such lines until they are proven commercially successful. Ultimately they should be sold to private enterprises on such terms as would permit of successful operation, as it is not believed that commercial aviation will ever be successfully developed entirely under Government control.

(J) The remaining aircraft-production industry should be conserved and kept in a healthy condition by a well-defined and continuing program of production for military purposes, over a period of years. This policy should be continued until the commercial demand is adequate to support an industry of sufficient proportions to form an effective nucleus upon which can be built a war-time production in case of need.

III. TECHNICAL DEVELOPMENT.

With reference to technical development, your mission in submitting its recommendations bases the following conclusions on a knowledge of conditions existing in the United States and upon extensive investigations conducted abroad:

(1) (*a*) The mission visited plants making or experimenting in materials as follows:

France: Breguet, Farman, S. P. A. D., Bleriot, Hispano-Suiza, Moran-Saulnier, Renault, and Nieuport.

Italy: Ansaldo, Macchi, Caproni, Pomilio, Isotta (plant closed by strike), and F. I. A. T.

England: Handley-Page, B. A. T., Rolls-Royce, Phoenix, Dynamo, Birstol, Vickers-Vimy, Cosmos, Sopworth, Grahame-White, A. B. C., and Armstrong-Whitworth.

(*b*) The mission has visited laboratory and experimental shops as follows: Institute Sperimentale Aeronautico, Rome; Eiffel Laboratories, Paris; R. A. Factory, Fransborough, England; Isle of Grain, Naval Experimental Station, England; Pulham Dirigible Station, England; Aeroplane Station, Contocelli, Italy, and Dirigible Station, Craspiano, Italy.

(*c*) The mission has interviewed the following governmental officials and industrial officers upon the subject of the proper organization, scope, and equipment of the technical division:

England: Gen. E. L. Ellington, head of department of design, London, Royal Air Force; Sir Percy Herouard, managing director, Armstrong-Whitworth

Co., 8 George Street, Westminster, London; Gen. Graves, R. A. F. representative with British Peace Commission, Paris; Gen. Brooke-Popham, director of research, London; Holt Thomas, London; Douglass Vickers, Vickers (Ltd.), London; Grahame-White, Grahame-White Aircraft Co., London; and Sir Samuel Waring, London.

France: Maj. d'Aiguillon, Interministerielle de l'Aviation Civile, Paris; Louis Breguet, manufacturer. Breguet et Cie, Cie des Messageries Aeriennes, Paris; Cacquot, former chief technical section, department military aeronautics, Paris; Col. Dorand, department military aeronautics, Paris; Gen. Duval, director military aeronautics, Paris; Jacques Louis Dumesnil, deputy, former undersecretary French aeronautics; Capt. de l'Estrade, technical service, French military aeronautics; Pierre Etienne Flandin, deputy, former chief interallied organization of French aeronautics, Paris; Messaguer, head of Hispana-Suisa Co., Paris; Maurice de Saint Blanchard, secretary Aero Club de France, and Daniel Vincent, deputy director, former undersecretary of aviation, Paris.

Italy: Commander Caldara, head of aviation, technical section, Rome; Casati, designer, Caproni Co., Milan; Lieut. Col. Ferduzio, designer of S. V. A. Rome Aeronautics, Rome; Col. Crocco, director of Institute Sperimentale; Col. Guidoni, Italian aeronautical mission; and Admiral Orsini, minister of Italian aviation, Rome.

2. The form of technical organization and control recommended by your mission differs materially from the controlling organizations in Italy, France, or England. Inasmuch as, for some time at least, military naval, and departmental flying seems likely to lead in the development of the art, your mission desires to lay emphasis upon the necessity of having these departments strongly represented in the operations of the technical division so that they shall be materially helped and not hindered in their research, experiment, and development. To the same end, we are of the opinion that lighter-than-air, which in England at the present time is independent, can be best served by making it a strong subdivision of the technical division. In both England and France, due to the closeness of the war, the technical division is at present dominated by military personnel, but the opinion is unanimous that, as time goes on, civil personnel will supersede military in this division. Gen. Ellington, England, expressed this opinion flatly and Gen. Brooke, Popham, director of research, England, holds the same belief. In the Royal Aircraft Factory, at Farnsborough, civilian requirements are already overtaking military and naval. It has therefore been deemed wise to take the ultimate step at the outset in America, and a civilian head, of the type now earnestly sought in France and England, is recommended for America.

3. In equipment and personnel, England and France and Italy are maintaining their war strength in the technical division. At Farnsborough we found a complete experimental plant, employing about 3,000 men and women, and carrying on actively nearly every line of research, experiment, and development in motors, planes, and accessories. More than a score of planes, rigged with apparatus for aerodynamic experiment, were in the hangars and in the field. Physical and chemical laboratories seemed busy and fully manned. Estimating the lighter-than-air and the naval experimental and research personnel, it seems probable that the plant and the personnel engaged in the division in England is nearly, if not quite, equal to the entire trade in America at the present time. Obviously, this branch of aeronautics lies at the very foundation of the future, both military and civil, and to fail to bring it up to the standard of the world can not help but mean dependence and mediocrity, or worse, in aeronautics in America.

4. The inclusion of such topics as armament (ordnance), wireless (signal corps), instruments (admiralty), photography (signal corps), design and bombs (ordnance), etc., has been found necessary in all countries. In reality, the design and supply of such appurtenances is left to the departments or bureaus specializing in them, but research and experiment and development, in methods of installation and use, is essentially a function of the air service technical division, and must be carried on by this division, both in the laboratory, on the factory floor, and especially in the air, in the tank, and on the field.

5. In all the European countries visited, we found that access to and use of the Government-owned facilities for development is established. The basis of such use varies, and can be adapted to the circumstances. In all countries, however, the principle is the same, namely, that private interests must obtain access to Government facilities, through the officers of the division, so that new

inventions, etc., shall pass the scrutiny and criticism of the division heads before going into actual experimentation. In England an attempt has been made to furnish facilities at cost, but to save overhead a schedule of flat prices is being worked out.

6. In England and France the question whether or not to design complete motors and machines no longer exists. France was forced to design airplanes in 1916, due to the failure of her private firms to meet the crisis created by the Fokker; but the immediate result appears to have been a quick return to the safer measures for encouraging the private designers to design and build, under the direction and assistance of the State. In England, the complete design of airplanes ceased with the SE-5; and both Government officials and industrial officers offered ample testimony that the making of complete designs was a mistake and would not be repeated, due to its effect upon the private design departments. Without exception the manufacturers appear to take the view that it would be idle to compete by private efforts if one division of the Government was designing and another division buying, as the Government would inevitably favor its own designers, even though not quite so good. The result of such a policy, therefore, would be to limit the number of sources from which useful designs can be obtained, and also to lower the standard of personnel in the design departments of private firms.

7. In 1918 Sir Arthur Duckham, then director of aircraft supply for England, said:

"As we all know, changes in design, unless they are actually for new types, may be absolutely against production; most of our delays in production in this country and in the countries other than ours have been due to the effort to obtain too great perfection at too early a time."

Having this in mind and having in mind also the disastrous effects upon production of similar causes in the United States, your mission asked explicit questions concerning the plan used by the technical division in England to minimize the result of such changes. The method is outlined as follows:

"All changes made necessary by the fact that a machine or motor is dangerous to the flier or to the public are classed as No. 1. These are imperative and are ordered by the director of design without delay. No machine is allowed to be accepted or flown without such changes having been made.

"Important changes involving improvement in performance, etc., are classed as No. 2. Such changes are made by order of the modification board described below, and became effective only at such time as not to interfere unduly with production.

"Improvements and additions not vital but often valuable, are classed as No. 3. They are made when convenient, both to Government and to contractor, and are not allowed to interfere with production or greatly increase price."

A modification board shall pass on changes and classify them. This board consists of five members, one from the technical division, one from production, one from operations, one from finance, and one from supply. In the case of No. 1 changes the director merely reports that such and such changes have been ordered. All other changes are ordered by the modification board at regular meetings.

Your mission is of the opinion that the establishment of some such uniform practice, covering not only such changes but also the method of paying for them, is essential to production, and should be a responsibility of the technical division.

RECOMMENDATIONS.

(*a*) That all technical functions of the Government in respect to aeronautics be centralized in a single technical division, which shall perform the work for the army, navy, and civil aviation; and which shall be headed by preferably a civilian of wide executive experience. Such a division should include as assistants to the director experienced representatives of army, navy, and other Government departments interested in aviation, who shall be nominated by the departments and shall act as advisors upon the special needs of the service they represent.

(*b*) That steps be taken forthwith to secure for the United States the most advanced equipment for research, experimental, and development work, and for the testing of motors, planes, balloons, etc., for the testing of materials; for the examination and testing of aeronautical appliances, including armament and instruments; and that such an organization shall be established

as shall assure at all times that the research, experimental and development activities of the Government shall be second to none.

(*c*) That the research, experimental, and development facilities and equipment now used in aviation by the army, navy, and other Government departments be inventoried immediately and put, as far as practicable, under the control of the technical division, retaining such of same as may seem suitable and bringing them under a central control to make a complete and efficient equipment, and discarding such of them as unnecessarily duplicate others or are out of date. In making this change, great care should be exercised to guard against measures which might tend to interfere with suggestions for improvements, and advances in aviation, material, and methods, coming from the operating aviation branches of the army, navy, and postal departments. Experience has proved that the initiative in the advance of motors, planes, and accessories often comes from practical experience in the flying field, rather than from the scientific department of aeronautics. The technical division will, in cooperation with the operating forces, study, work out and apply all such suggestions. Care should be taken also to avoid duplicating facilities already in existence, such as water tanks, armament-testing grounds, and many other items operated by existing departments. Arrangements should be made whereby the existing plants of this sort can be used on a proper payment basis by the technical division.

(*d*) That extreme care be taken in such a process of adjustment to provide ample means whereby the special technical needs of the (*a*) Army, (*b*) Navy, and (*c*) civilian flying shall receive attention. Means should also be provided whereby military and naval experiments of a secret nature can be carried forward.

(*e*) That the organization of the technical division cover by means of adequate personnal and equipment, all branches of aeronautical research, experiment and development, including the application and aerial use of instruments, armaments, and munitions, wireless telephone and telegraph, bombs and fittings, sights, fire-fighting apparatus, parachutes, air bags and other safety devices, motor appliances for air service, propellers and photography.

(*f*) That all the technical facilities of the technical division for aviation, whether now existent or to be created, shall be available to private inventors and designers, upon proper and reasonable terms.

(*g*) That in view of the experience of England and France, it is dangerous to allow the technical division to operate under normal or war conditions a department of complete design in heavier-than-air machines or in motors, as such competition results immediately in stopping private departments of design. The technical division, therefore, should be a critic of, and supplementary to, private design, rather than aim at design on its own account. The policy of the technical division should be to maintain and encourage a considerable number of well-manned and well-equipped private design plants and to cooperate with these plants in all undertakings that meet with the approval of the technical division, and to place orders with these plants, at fair prices, for design and for experimental construction of motors, planes, and appliances. Competition of the Government with the industry should be avoided; the only allowable exception being cases where, either on account of expense or for other cause, the technical division can not obtain needed material or design from existing sources.

(*h*) That careful thought shall be given to the establishment of competition in motor, plane, balloons, and accessory design, and encouragement be offered in every reasonable way to the promotion of competitive events and the establishment of standard records.

(*i*) That the technical division shall publish regularly and under competent management all the technical facts and data developed by the division that may be helpful to the industry, reserving at the same time to itself the right to preserve secrecy in all matters that are deemed to be in the nature of naval or military secrets.

(*j*) That such a technical division shall maintain at all times as close touch as possible with the development abroad and shall maintain representtives in Europe charged with the duty of liaison between the American and European technical organizations.

(*k*) That a definite method of payment for independent design, experimental production, changes in design, alterations and adjustments be worked out by the Government as quickly as possible, to the end that the design and improve-

ment of motors, planes, balloons, and appliances may be stimulated and not stifled.

(*l*) That the technical division shall include an inspection and testing department which shall carry on all inspections and tests of experimental construction and revision, and which shall issue certificates of air-worthiness for all machines for private and commercial use, and shall from time to time, inspect all machines and appliances, including landing fields, signals, etc., used by the public. In cooperation with the civilian division, this department shall have power to limit and control all types of air machines used in commerce, and to test such machines before they become production models. This department should have power to examine the inspection methods of all private concerns building aircraft, and to pass upon the quality of such methods from time to time.

(*m*) That close cooperation be maintained at all times with the purely technical aeronautical bodies, and also with the industrial bodies engaged in aeronautics, so that standardization of mterials and practices may be carried forward as rapidly as can be done without hindering the development of the art or entailing undue losses upon the trade.

Respectfully submitted.

Benedict Crowell, The Assistant Secretary of War; Howard E. Coffin, member of Council of National Defense; Henry C. Mustin,[1] captain, United States Navy; Halsey Dunwoody, colonel, Air Service, United States Army, Assistant Chief Air Service, American Expeditionary Forces; James A. Blair, jr., lieutenant colonel, General Staff, United States Army; George H. Houston, president Wright-Martin Aeroplane Corporation; C. M. Keys, vice president, Curtiss Aeroplane & Motor Corporation; S. S. Bradley, general manager, Manufacturers' Aircraft Association.

MEMORANDUM No. 1.

Subject: Report of the organization committee, American aviation mission.

1. I concur with the report of the organization committee of the American aviation mission, to which I have affixed my signature, with the following reservations.

(*a*) Provided that the personnel employed in naval aviation operations shall be composed exclusively of officers and enlisted men of the Navy, Marine Corps, Naval Aviation Reserve, and, where required for shore establishments, of civilians under the employ of the Navy.

(*b*) Provided that all advanced training of naval aviation personnel, excepting advanced aviation engineering courses, shall be under the direct control and supervision of the Navy.

(*c*) Provided that when officers and enlisted men of the Navy, Marine Corps, or Naval Aviation Reserve are detailed for duty with the proposed air department, they shall retain their naval or Marine Corps rank and ratings.

(*d*) Provided that administration and operation of all naval aviation forces shall be under the direct control of the Navy.

(*e*) It is recommended that the question of including in the proposed air department an offensive air force independent of the Army and Navy be left open, pending further investigation of this subject; and that the subject be investigated without delay by the mission in conference with Army and Navy representatives who have made a special study of military and naval strategy.

HENRY C. MUSTIN,
Captain, United States Navy.

MEMORANDUM NO. 2.

Subject: Report of the development committee, American aviation mission.

1. I concur with the report of the development committee, to which I have affixed my signature, with the following reservation:

(*f*) Provided that nothing in the organization of the proposed air department shall restrict the Navy in the following activities:

(*a*) Maintenance of an organization adequate for the preparation of general specifications, general plans and characteristics of the aviation mechanisms, accessories, and equipment required for naval purposes.

[1] Subject to memoranda 1 and 2, July 19, 1919.

(*b*) Maintenance of an organization and facilities adequate for carrying on experimental aviation work of a class that is exclusively of a naval character and that does not involve duplication of efforts and facilities in the proposed air department that are common to other aviation branches.

(*c*) Maintenance of an organization and facilities for conducting the acceptance and tactical tests of complete aviation mechanisms and accessories.

HENRY C. MUSTIN,
Captain, United States Navy.

SECRETARY BAKER'S STATEMENT.

In making public the report submitted to me by Mr. Crowell and his associates on the American aviation mission, I desire to emphasize the thoroughness and value of the studies made in England, France, and Italy with regard to the importance of aircraft and the essential dependence of the art for its development upon a sympathetic attitude in the Government. Those best informed throughout the world are in accord in believing that this new agency of transportation has possibilities upon which it is now quite impossible to set limits. They are further agreed that we face a period, more or less brief, in which the prospect of commercial return is not sufficiently sure to justify private enterprise in developing the airplane industry into a self-sustaining position.

The importance of aircraft as a military arm is obviously so great that we must leave nothing undone both to develop the art in its scientific and practical aspects and to provide facilities for rapid quantity production in the event of emergency.

From these considerations it is clear that the ingenuity and ability of American engineers and inventors must be coordinated and our national effort freed from wastefulness and duplication.

The mission has, in my judgment, gone too far in suggesting a single centralized Air Service. Army and Navy aviators are specialists in the art, both the airplanes and the pilots needed are of a different type from those needed in civil undertakings. The pilots, particularly, need to be trained upon a different theory. Military pilots are trained to fight singly or in formation, and to operate in coordination with other branches of the military service, so that their training must be military. Their own efficiency and that of the other branches of the service depends upon the most intense and constant associated training, and a separation of the Air Service from the Army or the Navy would require coordination of their activities in time of war, whereas effectiveness in military operation rests upon the concentration and singleness of authority, command, and purpose.

The point emphasized by the mission is the importance of maintaining adequate production facilities in this country. This, it is believed, can be brought about best by the establishment of a Government agency which will lay down the necessary rules, national and international, for aircraft operation, prevent discouraging lack of uniformity in State regulation, and generally stimulate private and public enterprise in perfecting and using commercially this mode of transportation, and by centralizing the placing of orders on Government account so as to have the incidental effect of making them contribute to the maintenance of aircraft production as an industry. It is not proposed, as I understand it, that great appropriations of public funds should be made for the establishment of uneconomic commercial air service routes, but, obviously, an extension of our air mail service could be made, and it could be further extended as the perfection of machines advances and their reliability of service is more and more established. Such encouragement as the Government may find it wise to give can be accomplished without sacrificing the science of military aeronautics. The joint board of the Army and Navy is already eliminating duplication and producing cooperation in developing the air service of those departments, and should Congress decide to extend its aid to the commercial development of aircraft, complete cooperation will be easy in all matters of invention, design, and production where the different aspects of the problem meet on a common ground.

NEWTON D. BAKER,
Secretary of War.

Mr. CALDWELL. Would you advocate the establishment of a Cabinet officer at the head of this branch?

Mr. CROWELL. I think it is immaterial whether the head of this branch is a Cabinet officer or not.

Mr. OLNEY. You would not consider, Mr. Secretary, that commercial aviation as practiced by the Post Office Department is a good-paying business proposition with the risk attendant upon life and property in the operation of airplanes between certain points, but only, perhaps, as an adaptation to the needs of the Army and the Navy; you do not consider that commercial aviation as practiced by the Post Office Department is a good business proposition?

Mr. CROWELL. I do not know. Their statements show a profit, but I have never analyzed them carefully.

Mr. OLNEY. After all, the expedition of mail—important correspondence—can not be better accomplished than by the telephone and telegraph and through the regular mail system in operation to-day. I have always considered that as a paying proposition it is a poor business one.

Mr. CROWELL. I am satisfied that by the elimination of risk, which can be accomplished by a separate air department, that commercial aviation would in a very few years be put on a sound footing commercially and profitably.

Mr. OLNEY. What happens to the family of an aviator who is killed in the service of the Post Office Department?

Mr. CALDWELL. There is provision for a year's pay, like anybody else.

Mr. Crowell, you mentioned the fact that you found over on the other side new aircraft that were made of a design that were rapidly changed into war craft—that is, a new commercial aircraft—and you mentioned the fact that the container for the mail could easily be changed to the container for the bombs. One of the greatest elements of safety in the construction of airplanes, as I understand it, is the dihedral angle of the wings. Did you find any difference in the angle used in the commercial machines and that used in the bombing machines?

Mr. CROWELL. I would not have noticed it if it had been there. I am not an expert in these things. My attention was not called to it.

Mr. HULL. Mr. Secretary, you have read the bill that I introduced on this matter, have you not?

Mr. CROWELL. Yes, sir.

Mr. HULL. How does that bill differ from your idea in regard to this matter?

Mr. CROWELL. I wrote you a letter at the time, did I not, that expressed it?

Mr. HULL. Yes; but, of course, my purpose now is to get it before the committee. As I understand it, your idea and the idea contained in my bill are practically the same, except as to some of the minor details. You go a little farther, I notice, in your statement here than I had intended going. You take up some matters—this commission is really what it would be, that I do not contemplate, at least at the present time.

Mr. CROWELL. Of course I am very much against a commission. I want a single head.

Mr. HULL. You can call it a commission or anything else. My idea is this, a director of aeronautics, having central authority over all production and research work.

Mr. CROWELL. As I recall your bill, you gave them charge of the production of all aircraft, did you not?

Mr. HULL. The acquirement.

Mr. CROWELL. Yes, sir.

Mr. HULL. The acquirement of aircraft.

Mr. CROWELL. And also you gave them authority over all civilian aircraft matters, did you not?

Mr. HULL. Yes; to a certain extent. They could release control to the different departments as they saw fit. At the start they would control, and if they saw that it was advisable to have the Navy Department or the Post Office Department or some other department have control, it would be up to the director to decide.

Mr. CROWELL. You made no provision for centralizing the training of men to fly?

Mr. HULL. I made no provision for that.

Mr. CROWELL. That is very important, in my opinion. There is tremendous duplication in the training of the men whether to fly over the land or over the water. The men should be taught by a central department and they could be taught better and more economically.

Mr. HULL. The idea that I had was this, that if you are going to do this you want to start with a plan that will meet with the approval of the different departments and if you take in primary training at the start you are going to antagonize the Navy and the Army. You understand, of course, very well that there is a vast difference of opinion in regard to primary training, as to whether this department should control that or not. Personally, I have not made up my mind. I have talked with all the people that I could in regard to the matter.

Mr. CROWELL. I have never heard any difference of opinion among those who have given careful thought to the matter. Among the Army or Navy or the civilians I have never found any difference of opinion as to the primary training of flyers.

Mr. HULL. Certainly, the Secretary of War has given it some study?

Mr. CROWELL. He has never given it the study which I intended when I made that statement, an exhaustive study.

Mr. HULL. Of course, I do not know but what you are right.

Mr. CROWELL. I felt just as you did a year ago.

Mr. HULL. The thought that I had is that if you are going to get a bill through to establish this department let the department itself control the appropriations to a large extent and if it was of such a nature that it merited branching out and controlling primary training it could easily do it. If it could not demonstrate that it could do those things, why, there would be a vast question as to whether it ought to do it or not.

Mr. CROWELL. Certain fundamentals are clear to me. I can not conceive of a bill that does not carry that to a certain extent.

Mr. HULL. How far would you go with the primary training?

Mr. CROWELL. I would go as far as training the men to fly is concerned.

Mr. HULL. Would you go to the observation, that is the main part?

Mr. CROWELL. I would not teach the men to observe; that is a specialty. I would specially reserve that to the Army and Navy.

I think you have made a strong argument in having that reserved to them. They can not bring a single argument to bear against that. The one fundamental is teaching the men to fly in the air. If you teach them primarily to fly and at the same time teach them to observe——

Mr. LaGuardia (interposing). It is not the same man who does that.

Mr. Hull. I know it is not, but it is in the same plane.

Mr. Crowell. The great thing, Mr. Hull, that I think you have neglected is the setting up of the fighting air force in the Air Department.

Mr. Hull. The fighting airplanes?

Mr. Crowell. Yes, sir.

Mr. Hull. Permit me to ask you one question. In your plan your idea is to control the appropriation, is it not?

Mr. Crowell. Under my plan, this new Air Department would have submitted to it by the Army and Navy and by any other outside bodies their estimates of aviation appropriations so they could be submitted to Congress.

Mr. Hull. Who would control the allocation of the appropriations?

Mr. Crowell. The War Department would control its funds, just as it does to-day, and the Navy Department would control its funds, just as it does to-day.

Mr. Hull. This department would not have the control that I anticipated at all?

Mr. Crowell. The Department of Aviation would control everything except observation squadrons which would be left in the War Department and the observation squadrons which would be left in the Navy Department.

Mr. Hull. You know this, that whoever controls the appropriations controls the whole thing?

Mr. Crowell. Why should not the War Department control the appropriations for its own airplanes, its own observation force?

Mr. Hull. Then, it could cripple this branch of the service in a minute.

Mr. Crowell. How?

Mr. Hull. Because if they controlled the appropriation, I do not see how it would operate.

Mr. Crowell. Perhaps, I have not made myself plain.

Mr. LaGuardia. Mr. Crowell is talking only about observation training and you are talking about the transportation. Is not this true, that the appropriations which would be given to the separate department would be absolutely under the control of the separate department?

Mr. Crowell. Yes, sir.

Mr. LaGuardia. And what appropriation was given, if any was necessary, for the training of the particular observers for the Army or Navy would be controlled by them?

Mr. Crowell. Yes, sir.

Mr. LaGuardia. Is it not also true that these observers would naturally be assigned to the air department to obtain the necesssary training under the direction of the respective departments?

Mr. CROWELL. Yes, sir.

Mr. LAGUARDIA. And they would be flyers of the air department?

Mr. CROWELL. In their training.

Mr. LAGUARDIA. In their training. The technical end of it they would receive on the ground from the Army and Navy, and so all of the appropriations for production, for training, for maintenance would be given to the special air department and be controlled by the air department. Is not that correct?

Mr. CROWELL. My conception is that the War Department and the Navy Department would figure the appropriations that would be necessary for the purpose for the year to maintain their aviation department which would consist merely of observation planes. They would then hand that over to the director of aviation who would include that in his estimates for his department. These would then go to Congress and the Army men would be estimated for by the War Department and the Navy men would be estimated for by the Navy Department and the Air Service men would be estimated for, but it would be included in one lump sum, one amount; there could be no such condition as I am told exists where one committee has appropriated for aviation without the knowledge of other appropriations for the same purpose.

Mr. HULL. I do not see how you could keep track of that unless there was one central authority, such as we provide for which should have control of it. The Naval Committee and this committee do not coordinate at all.

Mr. CROWELL. My conception is that there should be a congressional committee on aviation which would handle the aviation appropriations.

Mr. HULL. There you are getting in another angle to it.

Mr. LAGUARDIA. You mentioned a bombing project which was carried out by the Navy?

Mr. CROWELL. Yes, sir.

Mr. LAGUARDIA. As a matter of fact, they used land machines?

Mr. CROWELL. Yes, sir.

Mr. LAGUARDIA. And the flyers were trained in the Army training camps for that project?

Mr. CROWELL. Yes, sir.

Mr. LAGUARDIA. Some of them were, I know.

Mr. CROWELL. Yes, sir.

Mr. LAGUARDIA. And you said that it was a very small undertaking. It was?

Mr. CROWELL. Yes, sir.

Mr. LAGUARDIA. You are familiar with the fact that it caused big complications on the part of those on the other side?

Mr. CROWELL. I have understood so.

Mr. FISHER. Your statement has been very interesting and helpful. I want to ask you a question about the aviation fields. While you were the Assistant Secretary of War it came within your jurisdiction to designate the permanent fields that were asked for for the Air Service?

Mr. CROWELL. Yes, sir.

Mr. FISHER. There are a number of those fields which were designated as permanent which have not been paid for. Do you not think

that the acquisition of those fields by the Government is essential to the success of aviation?

Mr. CROWELL. Yes, sir; I do.

Mr. FISHER. You think that the Government should go ahead and buy the fields?

Mr. CROWELL. Yes, sir; it is absolutely necessary.

Mr. LAGUARDIA. I want to get this matter of Mr. Hull's clear. We are all striving for one thing, and that is to avoid overlapping of authority and duplication in the spending of money. Under a project or scheme such as you suggest it would naturally take one appropriation and the spending of that appropriation would be under the control of that air department; is that correct?

Mr. CROWELL. The spending of all the appropriation which had to do with the activities under the one air department, yes; but if the Army retains, as I am proposing, control of its observation squadrons, naturally it would then spend that appropriation.

Mr. LAGUARDIA. Could not the Army have control of those observation squadrons and yet the planes, the flyers, the production, the maintenance, and repair always be under the control of the air department and come out of their appropriation?

Mr. CROWELL. There is no doubt it could be done that way. I am merely telling you what I had in mind in this thing, and many of the details——

Mr. LAGUARDIA (interposing). Have to be worked out?

Mr. CROWELL. Must be worked out; yes.

Mr. OLNEY. In the final analysis would it not perhaps be wiser to create a department of aeronautics as a separate Cabinet position, the work being so important in the future in case of war, the preparedness for war, and as a commercial proposition? Has it ever occurred to you that it is really important enough to create a new department of the Government?

Mr. CROWELL. I am convinced that it is important enough. I believe it is the most important—or shortly will be—body connected with the national defense.

Mr. OLNEY. Then under the Secretary you could have your subdivisions and assistant secretaries?

Mr. CROWELL. Yes.

Mr. HULL. I think we are all agreed on that, and I would go there in a minute if I thought there was any possibility of doing anything along that line, but at the present time there is absolutely no possibility; it will take probably two years of agitation to create a separate department—is not that true?

Mr. LAGUARDIA. The gentleman does not know the temper of the House.

Mr. HULL. But it is the country we must deal with.

Mr. LAGUARDIA. The country is absolutely for this. The gentleman has been limiting his observations to conversations with responsible officers of the general staff—is not that true?

Mr. HULL. No.

Mr. LAGUARDIA. Who are the others the gentleman has spoken to?

Mr. HULL. In the first place, you want to look at this in a broad way. We are trying to do something and must not confine our views to what we want to do, but what we can get. The President, as I

understand, has stated that he will veto any measure that is brought before him creating a separate air department as a cabinet position.

Mr. OLNEY. But that was a year ago.

Mr. LAGUARDIA. Let me clear up something that was brought out by Mr. Olney. Our condition in this country in reference to the carrying of mail is quite different than what it is in the smaller countries of Europe, I mean geographically smaller.

Mr. CROWELL. Very different.

Mr. LAGUARDIA. So that we could establish a good many different mail routes that would really be necessary?

Mr. CROWELL. Yes.

Mr. LAGUARDIA. And useful?

Mr. CROWELL. Yes.

Mr. LAGUARDIA. And is it not also true that in order to keep abreast of the times in aviation and to develop the newest improvements in motors and planes we must have a large number of planes, and that in having the aviation service we need, with our coast guard and various other activities, we would have a sufficient number of planes and men, and that those men, instead of flying in circles around a field could be engaged in carrying the mail so that we could carry it with very little added, if any, expense to the country, and by having a perfect system of coordination between the Air Department and the Post Office Department we could really save money to the country by carrying the mail; is not that correct?

Mr. CROWELL. Yes; I happen to recall something of the report with regard to the last full year's operation of the New York-Washington mail route. That report shows a full performance during the entire year of something like 93 per cent and a profit of $17,000, I think. However, whether there is a profit or loss is a very small matter, in my opinion, the time they show as being saved in the carrying of that mail being the very large item. Now, the time that can be saved by a route, for instance, across this country is a thing that commercially is tremendously valuable. I saw an estimate the other day showing that if a route were established between Chicago and New York and merely carried mail devoted to financial matters —that is, carried the money that is transferred by express to-day— that the saving in time would more than pay a profit, merely the hours that they would save in a year in the amount of money that is being transferred between New York and Chicago.

Mr. HULL. There is no debate, as far as I can understand, in regard to the advisability of the expansion of the Air Service and of trying in some way to create a department such as you have recommended, the only difficulty being how best to do it; that is the only thing. Now, I have no pride of opinion, or anything else; if anyone can draw a bill that will do that well and good, but I want to call your attention to this and have you catch the idea that I have which is that by centralizing the authority under one man you would get the best results, having, of course, the assistance of the several departments, which would work in harmony with that department, and then turn over to this director the appropriations, and I would turn them all over. That man, if he is big enough—and he ought to be big enough, because before his appointment he ought to be well thought out—would then absolutely control the air situation through

the appropriations. That was my idea. Now, how far he wants to go is a matter that he must decide; I would have him go as far as he finds it possible, but it is easier for him and his assistants, working in conjunction with the Navy and the Army, to work out the details and take over the authority gradually than it is to try to create the authority at the present time, because the minute you give him too much authority you will arouse a great deal of antagonism on the part of these other departments. I do not know even whether you can do that, but I believe that much you could do, and if that man were a big man he would absolutely dominate the air situation.

Mr. CROWELL. I did not realize that your bill gave power to the director of air to operate and maintain a fighting air force.

Mr. HULL. And I do not know whether my bill does. I am redrawing the bill and will admit that it is not right; but that was my idea and it is the idea of the House. I think that if you could draw a bill—I do not care who draws it—by which this director will control the appropriations you can get it through and that that man can then control the whole situation.

Mr. LAGUARDIA. That is exactly what we want to do.

Mr. HULL. And let him work out the details later?

Mr. CROWELL. I would have no objections to a bill which would allow that to be done.

Mr. HULL. That is practically the thought I had in drawing this bill, but I will admit I do not know whether it is specific enough in that matter. I am redrawing the bill or having the bill redrawn in the War Department, but that is the thought I have, that the director should be the whole show, to use a slang expression, in regard to the Air Service because he would control the appropriations and if he controls the appropriations and does not run the thing it is his own fault.

Mr. LAGUARDIA. Mr. Crowell, have you, in the course of your consideration of this matter, conferred with officers of the Army who are really experts in aviation in regard to a separate air department?

Mr. CROWELL. Yes; I have conferred with a great many of them.

Mr. LAGUARDIA. Do you find that the consensus of opinion among them is that there should be a separate department?

Mr. CROWELL. Well, I find that the more study given by an officer of the Army the greater his tendency to swing in the direction of an outside, independent department of air. The action of the board headed by Gen. Hahn quite recently was, perhaps, a good example of that. This board was appointed by the Secretary of War during the summer to report to him on the bills which were then before Congress. The New bill, I think, and the Curry bill were the two specially mentioned. This board consisted of Gen. Hahn, Chief of the War Plans Division of the General Staff; Gen. Snow, Chief of Field Artillery; Gen. Coe, Chief of Coast Artillery; and Gen. Menoher, Chief of the Air Service. When the board was appointed the general comment was that a more conservative board could not possibly have been discovered, and by conservative I mean a board which would be least likely to change the existing organizations. The members of the board have told me that their opinion at first was exactly as I have stated, but as they gradually studied the subject they have changed their minds and they finally came out with

a report which your bill, by the way, very closely followed, or possibly they followed your bill; but they were very nearly the same.

Mr. HULL. It was accidental, because I did not know what they were going to report, and they knew nothing about my bill.

Mr. CROWELL. They recommended a centralized independent department for certain things. Of course, Gen. Menoher has been one of the irreconcilables from the start, and is to-day, and it started with his influence, which is very large. There is no better officer in the army. But, in spite of that, this board, after long and careful study, made the report I have described. I have found there has been that tendency among all the officers after they have studied the subject. They made a canvass of the officers of the Army—which I have considered perhaps the most authoritative body to report on this, because they are soldiers—and asked their opinions, and, much to my surprise, I found that the following officers have come out and unqualifiedly favored a separate air department. I have quite a list of officers, and I am not going to read the list because of its length but because of its quality. It is headed by Gen. Liggett, whom everybody regards as one of the—well, we all know his record; he is one of the very best men in the Army. Gen. Joseph E. Kuhn is on this list; he was president of the Army War College from January, 1917, to August, 1917, and he commanded the Seventy-ninth Division. I wish to say, too, that all of the men on this list saw active service in France. Maj. Gen. George W. Reed, Maj. Gen. William H. Hay, Maj. Gen. Peter E. Traub, Maj. Gen. Clarence R. Edwards, and Maj. Gen. Leonard Wood are also in favor of a separate air department. I have just mentioned a few of the higher-grade officers, and it is rather surprising that these happen to be men who have given the most study to it. As we go down in the ranks I have never endeavored to make a canvass, but I think you will find about the same thing.

Mr. HULL. I have found practically no one but what thinks some steps ought to be taken along this line, and practically all of them agree that it should be started in the manner I have outlined. Of course, they have not gone into the details, as many of us have, but I think everyone of them believes this: That if you turn over to the director of aeronautics practically everything in the Navy and the Army that is there now and will be there in the future, together with the appropriations, with full authority to allocate them as he sees fit, that you have done everything that he could ask for, or anyone else, except to create a Cabinet position, which, I think, is not advisable at the present time, because I think it would take too long to start it. Now, if you start it this year and the man at the head of it demonstrates that the air service is of the importance that we pracically all agree it is, it will not be long until you will create a Cabinet position. That is my thought.

Mr. CROWELL. I have never recommended a Cabinet position.

Mr. HULL. And I think my bill, as far as I can analyze it, provides for that. I will refer briefly to section 6:

> That on and after the passage of this act any and all unexpended appropriations made for the development or production of aircraft shall be transferred to the department of aeronautics. This shall include any and all moneys appropriated for the development, purchase, manufacture, leasing, or acquiring in any way aircraft of any kind by the Government.

And then I go on and turn over to this department all that they have in lands and everything else. The different departments can come to him and ask for money for land, for machines, etc., and he can give it to them, if he sees fit. So I do not see how in the world you can give him any more authority.

Mr. OLNEY. Mr. Crowell, out of fairness to you, I think it should be stated that Mr. LaGuardia was appointed the chairman of the subcommittee on aviation during the next two or three weeks and he is to thresh out all matters connected with aviation. Would you not recommend that we take up the question of compensation? It seems to me there is no vocation in the world involving as much risk as this, and to my mind men who are trained as flyers should receive double the compensation they are receiving to-day. We know that locomotive engineers and firemen to-day on railroad systems receive approaching $3,000 a year, and that being so why are not these men entitled to better compensation than they are receiving to-day and why should not provision be made for their families when they are killed in the commercial service or in training for the Army or Navy? Would you not recommend that we increase the salaries of these flyers?

Mr. CROWELL. I think the compensation should be increased and should be made suitable to the risk that they run and to the duties that they take on, but just where it would stop I am not able to say at this time.

Mr. LAGUARDIA. We will take that up later.

Mr. OLNEY. I think they should receive proper recognition.

Mr. HULL. Once you get the department established it will take care of that.

Mr. LAGUARDIA. Just one more question to bring out the idea as to how far we have progressed or how much development we have made since the armistice. Is it not true that if we should suddenly get into some trouble with, say, a neighboring nation and that neighboring nation has, in the course of the last three or four months, purchased from France or England 24 up-to-date pursuit planes, would it not have supremacy in the air as we stand to-day?

Mr. CROWELL. I think it would, in pursuit planes.

Mr. OLNEY. Has Mexico, to your knowledge, any air force to speak of, that is, a strong, military fighting air force?

Mr. CROWELL. We have no information that they have a strong air force but we know that they have plans for a strong air force.

Mr. OLNEY. If we had war with Mexico there could be no better military force than an aeroplane force?

Mr. CROWELL. Provided they had modern machines.

I have here a statement (Exhibit B) made by the Office of the Director of Air Service showing the apportionments made of the $25,000,000 appropriation "Air Service Army, 1920." It shows that $14,921,569.46 of the appropriation is already obligated; none of this money nor any of the balance is available for the purchase of new airplanes. It also shows that there has been apportioned but not yet entirely obligated $1,000,000 for the maintenance of engines; $1,375,200 for the maintenance of airplanes and spare parts and altering DH-4's; and $1,112,800 for the maintenance of balloons and nonrigid airships.

(Thereupon the subcommittee adjourned.)

EXHIBIT B.

Statement of appropriation, "Air Service Army 1920," as of Nov. 30, 1919.

No. of apportionment.	Purpose of apportionment.		Total apportionment.	Obligations.	Balance.
701	Maintenance and operation of aviation schools:				
	Mechanics schools	$74,700.00			
	Pilots schools	20,000.00			
	Balloon schools	16,128.00			
	Dirigible schools	125,000.00			
	Subsistence of 600 flying cadets	180,000.00	$415,828.00	$118,537.25	$297,290.75
702	Photographic supplies for aerial observers, photographic section		100,000.00	28,593.28	71,406.72
703	Improvement of aviation stations, balloon schools and plants for testing and experimental work, engineering		72,000.00	72,000.00	.....
704	Maintenance and operation of stations:				
	Engineering	$516,000.00			
	Hospitals	60,500.00			
	Buildings and grounds	1,672,460.00			
	Purchase of hydrogen	212,030.00	2,460,990.00	1,248,203.91	1,212,786.09
705	Development of helium:				
	Gas rights for helium	400,000.00			
	Army share of completion and operation of United States Government plant at Petrolia, Tex	596,000.00	996,000.00	536,000.00	460,000.00
706	Utilities at stations:				
	Engineering	33,000.00			
	Purchase of light and power	290,000.00			
	Purchase of water	4,000.00			
	Mechanics schools	11,000.00			
	Buildings and grounds	265,200.00	603,200.00	132,825.89	470,374.11
707	Lease of land and rental of buildings:				
	Engineering	22,000.00			
	Real estate section (land)	179,120.53			
	Real estate section (buildings)	244,934.00	446,054.53	233,688.49	212,366.04
708	Payment and expenses of civilian employees:				
	Payment of civilians in the District of Columbia	1,390,616.24			
	Payment of civilians outside the District of Columbia	8,228,367.71			
	Traveling expenses of civilians	25,000.00	9,643,983.95	6,496,501.92	3,147,482.03
709	Experimental and research:				
	Engineering	1,394,000.00			
	Balloons, airships, and accessories	196,625.00			
	Medical	25,000.00			
	Miscellaneous	40,000.00	1,655,625.00	1,521,151.50	134,473.50
710	Production and purchase of airplanes and their spare parts:				
	Altering DH-4's	375,000.00			
	Airplane maintenance	1,000,000.00			
	Airplane maintenance in Paris	200.00	1,375,200.00	1,081,968.88	293,231.12
711	Production and purchase of balloons and airships and their spare parts:				
	Maintenance of 30 balloon companies	150,000.00			
	6 nonrigid airships, Mexican border	550,000.00			
	Maintenance of 6 nonrigid airships on the Mexican border	72,000.00			

Statement of appropriation, "Air Service Army 1920," as of Nov. 30, 1919—Con.

No. of apportionment.	Purpose of apportionment.		Total apportionment.	Obligations.	Balance.
711	Production and purchase of balloons and airships and their spare parts—Contd.				
	Maintenance of 7 nonrigid airships	$100,800.00			
	Replacement of 12 nonrigid envelopes	240,000.00	$1,112,800.00	$773,898.00	$338,902.00
712	Production and purchase of engines and their spare parts, engine maintenance		1,000,000.00	118,295.11	881,704.89
713	Production of instruments and accessories for aircraft and engines, miscellaneous		2,609.50	1,609.50	1,000.00
714	Construction of gas plants, hangars, and repair shops:				
	Aerodromes, Mexican border	$274,200.00			
	5 airship hangars, Mexican border	450,000.00			
	1 airship hangar assembly	250,000.00	974,200.00	806,881.51	167,318.49
715	Purchase, manufacture, and issue of special aviation clothing and similar equipment		5,000.00	320.00	4,680.00
716	Necessary expenses connected with the disposal of surplus material:				
	Payment of civilians in the District of Columbia	$98,800.00			
	Rental of buildings	309,482.00			
	Miscellaneous expenses	758,617.88			
	Payment of civilians outside of District of Columbia	585,475.00	1,752,374.88	1,222,200.84	530,174.04
717	Services of consulting engineers		10,000.00	10,000.00	.....
718	Establishment of aviation stations in the Philippine Islands		350,000.00	324,100.00	25,900.00
719	Claims for damages not exceeding $250		50,000.00	334.00	49,666.00
720	Officers' expenses while traveling by air, engineering		3,000.00	3,000.00	.....
721	Miscellaneous expenses:				
	Patent fees	$2,600.00			
	Office equipment	14,500.00			
	Foreign and professional periodicals, papers, publications and miscellaneous printing	107,690.00			
	Miscellaneous expenses	394,747.47	519,537.47	191,459.38	328,078.09
	General reserve		201,596.67	.....	201,596.67
	Director of Air Service reserve		1,250,000.00	.....	1,250,000.00
	Totals		25,000,000.00	14,921,569.46	10,078,430.54

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Friday, December 5, 1919.

The subcommittee this day met, Hon. Fiorello H. LaGuardia presiding.

Members of the subcommittee present: Representatives LaGuardia, Hull, Caldwell, Fisher, and Olney.

STATEMENT OF BRIG. GEN. WILLIAM MITCHELL, CHIEF OF TRAINING AND OPERATIONS GROUP, AIR SERVICE.

Mr. LAGUARDIA. General, what is your official assignment at this time?

Gen. MITCHELL. I am chief of the Training and Operations Group, Army Air Service.

Mr. LaGuardia. How long have you been in the Air Service?

Gen. Mitchell. I have been in the Air Service about four years.

Mr. LaGuardia. And you are a flying officer?

Gen. Mitchell. Yes, sir.

Mr. LaGuardia. Will you tell us briefly your assignments during the war.

Gen. Mitchell. I first went to Europe as military observer for aviation just before the war opened, and after arriving in Europe I joined the French and British Armies, which were then operating on the western front, and observed the manner they had of handling their aviation and their ground troops, until Gen. Pershing's expedition arrived. After Gen. Pershing's expedition arrived I assisted in the organization of the aviation of the American Expeditionary Forces, and had command of the first corps, Air Service, and then of the Air Service of the First Army, and then of the Air Service of the group of armies; that is, all the Air Service serving on the front serving with the American Armies. When the group of armies ceased to exist, at the time of the armistice, I commanded the Air Service of the Third Army that went into Germany and occupied the bridgehead at Coblenz.

Mr. LaGuardia. General, you were in command of our aviation forces at the St. Mihiel drive.

Gen. Mitchell. Yes, sir.

Mr. LaGuardia. And you were flying at all times?

Gen. Mitchell. Yes, sir.

Mr. LaGuardia. You also commanded our aviation with the First American Army?

Gen. Mitchell. Yes, sir.

Mr. LaGuardia. I mean by commanding that you were actually on the fighting front at all times.

Gen. Mitchell. Yes; I commanded it until the group of armies was established, when Col. Milling took command of the aviation of the First Army and I took command of both armies.

Mr. LaGuardia. And you have been honored with the distinguished-service cross?

Gen. Mitchell. Yes, sir.

Mr. LaGuardia. And also by the French and British Governments?

Gen. Mitchell. Yes, sir.

Mr. LaGuardia. Now, General, will you make your statement and we will not interrupt you until you are through?

Gen. Mitchell. The time has come in our development as a Nation when we must look at our military policy in this country from a standpoint that we have never regarded it before. By our entrance into the European war we injected ourselves into world politics in a more strenuous manner than has ever been the case in our history. Consequently, we can not avoid the responsibilities that come with that situation. We have proved during this war that we are entirely self-sustaining as a Nation, in so far as men and materials of war are concerned. In other words, we have proved that if we have a military organization in this country which can be mobilized and concentrated and supplied, say, within a month, and one that is reasonably trained, we need fear no navy or combi-

nation of navies which would occupy the Atlantic Ocean or the Pacific Ocean, or both, providing we can deny them a place on this continent from which they can operate. In other words, we believe that our entity as a Nation can be maintained against any combination of navies by a military organization alone.

On the other hand, a new element has come into warfare during this war, namely, the air service; and no matter to what extent we may deny hostile troops that are brought over to this country by naval vessels a landing on our coasts unless we are adequately prepared in the air we can not deny an air service access to any vital points in this country. We have proved that we can get to any part of the country east of the Mississippi River in eight hours from either the Atlantic or the Gulf coasts, or both, and we can get to any place west of the Mississippi within about 10 hours. If we give up the air to a foreign power, it has been proved during the war that they can cause incalculable damage with their air service alone by hitting our industrial and other centers of organization for war, and in all probability they could bring about a decision by their air service alone. The reason I say that is because in the beginning of the war airplanes carried missiles that weighed only a few pounds. At the end of the war they carried missiles that weighed upward of a ton each. That progress is still going on, and the progress has been so great since the armistice that I believe there has been as much since the war as there had been for the period of the whole war. By that I mean that aviation is developing even more rapidly now than it did during any time in the war.

We also believe that an adequate air service will not only greatly hamper the operations of any navy against us but will put within a comparatively short time all surface vessels under the water; that is to say, they will be unable to resist aerial attack in any decided way. This is particularly so since the successful development of impelled torpedoes, burning bombs, aerial cannon, means of destroying searchlights on ships, smoke screens and depth bombs, radio communication has been established between airplanes and submarines, and due to impossibility of ships concealing themselves on the surface of the water from airplanes.

Now, this is a general statement as to the necessity for having an adequate service.

With us in this country we have come out of the war with one great asset in so far as aviation is concerned, and that is we trained a navigating personnel of about 15,000 officers during the war. By navigating personnel is meant pilots and observers. We also created a personnel of officers who had learned by experience on the front and by the handling of some of the greatest air units that the world has ever seen their business as air officers. Aside from the personnel that was developed we developed an industry in this country for the production of airplanes, which, although it copied foreign models all the way through, which did not give our inventors in this country the initiative they might have enjoyed, still it created a means of obtaining raw material for the construction of airplanes and a method of their actual construction which was excellent. This industry has practically ceased to exist, due to the fact that no orders have been given it. We are the only one of the large nations of the world that has done that.

In so far as the navigating personnel is concerned, about 925 of them have been retained in the service and the rest of the 15,000 have been allowed to disperse and go to their various homes and places of abode without any specific organization or method of keeping particular track of them or getting them back in the service in case of an emergency. Some have joined the Signal Reserve Corps. These officers are essentially air officers; that is, these navigating officers will not serve willingly in any other branch of the service, because their whole interest lies in aviation. But, on the other hand, with any sort of an organization of reserves, either active or passive, they will be perfectly willing to join any aviation that we may see fit to organize.

It is more expensive to create a pilot and it takes a longer time than it does to produce any other individual for military work, and no other nation has as large a number of pilots and observers as we have. If you do not have pilots, you can not fly airplanes, and therefore if we have any industry at all or anything of that sort for the production of airplanes we have got to have pilots to fly them. In time of peace we must encourage civil aviation as far as we can in order to produce equipment for use in war. Civil aviation alone can not be made to pay on any large basis at the present time. It is developing, however, constantly.

The greatest aid, not only to military aviation but to civil aviation, will be the maintenance and upkeep of airdromes all over the country. We have the best flying conditions in this country of any country in the world, generally speaking. The airdromes are necessary for the development of aviation in the same way that gas stations and repair stations are necessary for automobiles on any main roads or highways. We have flown over routes from east to west and north to south practically all over this country, and by all the large centers of population, which, at the same time, are the strategical centers; and we have tried to induce—and have succeeded in a great many cases in having—the municipalities to reserve ground for airdromes. What we are unable to do, however, is to sell gas and oil and spare parts, etc., to commercial airplanes and others who are forced to use these airdromes. What we now want to do is to organize all these airdromes throughout the country so that they will be available not only to our reserve aviation units but for any aviation which may want to avail itself of these facilities. That will be the greatest aid we can give at this time to aviation; and if we combine this with the organization of our reserve units that already exist, potentially, we can do it very cheaply and with very little trouble. We can also give them the obsolescent equipment which we have acquired during the war—both training and otherwise—so as to keep up their flying.

If we organize this system of airdromes, which it will be necessary to do, and make it available to the airplanes of not only our own people but the airplanes that are coming in from foreign countries, we must have a force for properly policing the air, seeing that the airplanes that come across from foreign countries are properly inspected; that they do not bring in diseases, for instance, or contraband material; that they are safe to fly over our cities; that the navigating personnel is capable of handling them, etc. As they have

to land on these fields and be revictualed there, etc., it is quite evident that the same direction should inspect them and look after them that keeps up the field. That is being done by every first-class country in the world except ours. At the present time we have no regulations whatever on the subject.

Next we have various departments of the Government interested in the use of aircraft; that is to say, the Army is interested in it, the Navy is interested in it, the Post Office Department is interested in it, the Coast and Geodetic Survey, the Coast Guard, Life-Saving Service, revenue officials, the Forest Service—in fact, nearly every department of the Government has some use for aircraft and personnel. If each develops along its own line the overhead will be multiplied in every case. Furthermore, training will result in a difference all the way through. Basically, all air work is essentially the same, no matter where it takes place, and basically all training is the same. There is no reason why we should have an overhead for each one of these entities instead of combining the overhead under one general direction.

Next, from a military standpoint, it is essential to have a direction from one common source because fighting in the air is the same no matter where it may take place, whether it be over the water or over the land. The only part of aviation that essentially belongs and has to be attached to an army and a navy for their own domestic use is observation aviation, which relates to local reconnoissance for them, that is, seeing the objects that are at or near to them; the adjustment of their artillery fire, that is, telling them where their projectiles are hitting and how; and to liaison between their different elements, by liaison is meant keeping communication up between them.

All pursuit aviation, and by pursuit aviation is meant that aviation which pursues, catches up, and attacks a hostile aviation, and which, by its very nature, is the most important aviation there is, because if you can shoot the enemy completely out of the air you have predominance over him—pursuit aviation is the same no matter where it is. Bombardment aviation is handled exactly under the same principles, by bombardment aviation is meant that aviation which carries heavy projectiles and throws them down in various ways. Attack aviation is that aviation which attacks objects on the ground, either troops, vessels, trains, or things of that kind.

The principal mission, therefore, of aviation, is not observation for units to which it is attached, but is the destruction of the hostile aviation, in the same way that the principal mission of the navy is the destruction of the hostile navy, or the principal mission of an army is destruction of the hostile army. Therefore, in order to unite and bring your greatest effect to bear in any one place it is necessary to unite all the elements of your aviation at the place where the decision is to be called for, no matter whether it is war on the sea or war on land. In this particular case we had a war on land, essentially, in Europe. No nation ever held the sea to the same extent that the Entente Powers or the Allies held the ocean during this emergency. It was necessary, therefore, to concentrate all the aviation against the enemy on land, and that is where the fighting in the air took place. There was no fighting on the sea to

amount to anything. The use of aviation on the sea related almost entirely to observation and reconnoissance.

Now, those are the main considerations which impel us to recommend that the United States unify its air services under a central direction, which will give the greatest economy in administration and upkeep and at the same time will put the direction of air service matters under air officers who are expert in its use and handling, and who are essentially interested in its development, as distinguished from putting it under the older services, who regard it as an auxiliary and who are not specifically charged with its development as an arm by itself. All other great nations have come to this solution—that is to say, of uniting their air services. Those are the main considerations, Mr. Chairman.

Mr. HULL. General, have you read the different bills that are pending before Congress in relation to this matter?

Gen. MITCHELL. I have read some of them; yes, sir.

Mr. HULL. How many of them?

Gen. MITCHELL. I have read Mr. Curry's bill, and I have read Senator New's bill, and I have heard about your bill, but I have not studied it or read it. I have been out on inspection tours recently and have not had an opportunity yet of looking it over.

Mr. HULL. Do you favor the placing of aviation under an executive department, and the creation of such an executive department with a Cabinet member?

Gen. MITCHELL. I believe at this time, Mr. Hull, we should organize it as a department, but not with a Cabinet officer. I believe it should be a separate department, however. On the other hand, I think its importance is such that it will be a Cabinet position eventually. I think its importance is coequal with that of the Army in the national defensive scheme at present, and will soon be superior to that of the Navy.

Mr. HULL. The bill which I have introduced simply contemplates the creation of a department of aeronautics, in line with your thought, with a director of aeronautics, who would coordinate with the three other branches, the Army, the Navy, and the commercial, by having an assistant director from those departments; and with the control of the appropriations, he would practically control everything so far as he was able to prove that he ought to control.

Gen. MITCHELL. What would prevent that central department, under those conditions, from prescribing any sort of equipment or any sort of airplane desired, exclusively of what the people flying them on the front wanted?

Mr. HULL. That would be the very point. He would be the director of aeronautics.

Gen. MITCHELL. Yes; but he would not be a military officer under those conditions; that is to say, he would not be an officer of the military branch of the service.

Mr. HULL. Do you want a military man?

Gen. MITCHELL. No; we want an Air Service man. A man who has been brought up and trained in it.

Mr. HULL. What would prevent the appointment of that kind of man?

Gen. MITCHELL. Nothing in particular, I guess. I mean by that I believe that in any department which you establish it is essential

that you have an air force under it in the same way that you have an army under the War Department.

Mr. HULL. Certainly.

Gen. MITCHELL. The War Department is a civil institution, at the head of which is a Secretary, who is charged with bringing the wants of that department to Congress. I believe that it is essential we follow out the same general system we have in the Army and in the Navy in that respect. If you go to complicating it——

Mr. HULL (interposing). Do you contemplate operation as a separate unit—as I understand it, you do?

Gen. MITCHELL. Our idea is this, Mr. Hull: Under that Department of Aviation you have an air force which has one branch with the Army and one branch with the Navy, which would handle under the Army and the Navy the observation aviation which they need for their domestic and local use, but that the personnel assigned shall be air-force personnel; they would act very much in the same way that the Marines were when they were assigned to duty with the Army.

Mr. HULL. I understand, and I quite agree with you, but my idea is that all those matters are matters of detail.

Gen. MITCHELL. If you will let me go on a minute I would like to explain further. Now, then, you would have an air force for the military service, one for the Navy, and a central flying force for offensive duty, which could be used anywhere—that is, pursuit, attack, and bombardment aviation. I would recommend a director of civil aviation under the department, who would be charged with drawing up and looking after all laws regulating the use of civil aviation, the upkeep of aerodromes, and their proper policing, etc., of the assignment of personnel and matériel to any of the civil departments of Government that required its use, such as the Post Office Department, the Treasury Department in its various activities, and other departments of Government. His work would be to see that suitable personnel and matériel was supplied to them and that it was kept up.

In the case of the Post Office Department they would have complete, we might say, tactical jurisdiction over it. They would establish the schedules and do anything they desired to do, but they would not be charged with maintaining a technical section for the development of equipment or with a purchasing department for getting it, or anything of that kind. Furthermore, this would give general supervision over all this equipment so it could be transferred or transformed to war use whenever necessary, very much in the same way that ships are designed for that purpose now. As another branch, I would have a supply branch which would be charged with the finances, with the technical work and with the production of this material. Now, those are the three big branches, the civil branch, the supply branch, and a skilled air force, under a central officer who would be a civil officer of the Government.

Mr. HULL. I quite agree with you and I do not know that it is necessary to take up the time of the committee debating in regard to it. Of course, as I look at it, all these matters that you mention are largely matters of detail that should be worked out, not by this committee and not by arguments from the Army or the Navy, but

by the Director of Aeronautics in connection with the three assistants whom he would have, one from the Army, one from the Navy, and one from the commercial.

Gen. MITCHELL. Yes, sir.

Mr. HULL. They are the best authority. We can debate it here until the end of time and we can arrive at no conclusion, but if you place it in the hands of an organization like that, they will work out and demonstrate how far they can go, and if you catch my idea, it is that when you turn over to the Director of Aeronautics and his assistants the appropriations that Congress makes, they have all the power in the world to work out their own department, and I will guarantee they will do it. I never saw a department yet that if you gave them enough money would not work out all the authority they ought to have. As to the details, I do not know that I would agree with you at all on some of the things, but I do not think it is necessary to debate those propositions.

Mr. LAGUARDIA. You are the only one debating them.

Mr. HULL. No; I am simply explaining it to him.

Mr. LAGUARDIA. We are all agreed that we should not debate the details, but you are the only one bringing them out.

Mr. HULL. No; he brings them up and I simply say, for instance, in regard to the obtaining of the supplies in the field and those things, we might not agree at all on that, but what I want to find out is this—I am not debating the matter, if you will notice, but I want to know if the general does not agree with me that if we create a department and give them sufficient authority, they will work it out for themselves.

Gen. MITCHELL. If you give them sufficient authority there is no question but what they will work them out, but you have got to give them sufficient authority and not curtail it or make it so complicated that they can not operate.

Mr. OLNEY. General, I thought it would be well to have you make a statement to the committee as to how well equipped we are and how well prepared we are in case of war with a foreign nation, or with one on this continent, as to getting airplanes or observation planes; what we have on hand in good or bad condition; or what we have that might be put into condition for fighting purposes within a comparatively short time.

Gen. MITCHELL. Since the declaration of the armistice we have constructed no new equipment in this country. The equipment which was constructed before the armistice is now of an obsolescent, if not an entirely obsolete, type. All of the equipment that we constructed for war purposes before the armistice was of a foreign model. That was necessary because we had not, at that time, developed any types which had been proven in war. The other nations of the world kept right on with their progressive development of aviation equipment, so that at this time they have in their hands, or they are capable of getting within a very short time, equipment which is entirely up to date. By this I mean that at the time of the armistice we were using in pursuit ships engines of 220 horsepower. Pursuit ships of to-day are equipped with engines of 340 horsepower. The same proportion obtains with ships for observation or for bombardment or for attack, so that at this time you might say, strictly speaking, we have no war equipment with which to conduct a war against a first-class power.

We have models of such equipment on hand which are the equal or superior to any others in the world. They are on hand at our engineering section at Dayton, and we have inspected them personally and they are splendid. It will take us from a year to a year and a half or two years to produce them in sufficient quantity to put them in the hands of our troops in case of trouble.

After ships are constructed it always takes some time to work out what we call the "bugs" in them; that is, the small deficiencies which always crop out. The way that is done in any other first-class country is that the models of airplanes are selected to do a certain specific work. A few of them are produced, put in the hands of the people who have to use them, and they decide which ones should be constructed. Then enough are constructed so that they can be used tactically, and all the machinery and things necessary for their construction are accumulated, so that a great many can be used for various kinds of work. Under those conditions you are always ready for production on a big scale in case the necessity arises. Does that answer the question?

Mr. OLNEY. Yes; except I would like to know specifically if we have a dozen or twenty planes, either fighting planes or pursuit planes.

Gen. MITCHELL. We have no pursuit ships in this country, except those imported from France and England.

Mr. OLNEY. How many of those have we?

Gen. MITCHELL. 1,200, with no spares.

Mr. OLNEY. And those could be put into fighting condition within a few months?

Gen. MITCHELL. You could not maintain them on the front at all. Their only value really is for training purposes. The whole fact of the matter is that if you do not unite our air service and get some central direction, under people who understand about an air service, we will just say to the foreigners, "We do not want any air service; you can take it and keep it." Now, that is the whole amount of the thing in a nutshell.

Mr. OLNEY. General, this committee about two years ago appropriated $640,000,000, and later $100,000,000, and subsequently $50-000,000. Is any of that amount on hand today?

Gen. MITCHELL. I think a good deal of that has been reconverted into the Treasury, but how much of it has been reconverted I do not know, but what that has resulted in has been the training of these 15,000 officers we spoke of, and the securing of fixed assets throughout the country in the way of fields and buildings and equipment necessary to produce a force. That is a fixed asset which, if you want to, you can keep up at comparatively small cost.

Mr. OLNEY. You mean by that, flying fields, equipment and other matériels.

Gen. MITCHELL. Yes, sir; we have a good deal of it for training purposes. You have got no war equipment to amount to anything, but we have prospective war equipment that will be coming on in this country, not only in the way of airplanes, but cannon. I saw a better 37-millimeter cannon the other day at Dayton, and saw it shot, than I have ever seen anywhere, and also a new .50-caliber machine gun.

Mr. LaGuardia. Will you explain that 37-millimeter cannon to the committee, General?

Gen. Mitchell. The 37-millimeter cannon, gentlemen, is a cannon, with a projectile of about 1½ pounds weight. It can use high-explosive shells or it can use an armor-piercing projectile. It can use percussion shells, which can be used against large aircraft, such as Zeppelins or things of that kind, against large airplanes, against tanks on the ground, or any equipment that is armored in about the same manner. This gun shoots at the rate of 110 shots a minute, and it charges with 10 projectiles at the same time. Our 50-caliber machine gun will be supplied with the Browning mechanism, and has an initial velocity of 2,400 feet a second, and is bigger than the German antitank gun, and will also have five kinds of projectiles that it can use. It will shoot at the rate of about 700 a minute, and its ammunition will weigh about 25 pounds to the hundred rounds. It will pierce any armored airplane that now exists. We also have splendid specimens of armored airplanes out there, with quarter of an inch armor underneath and three-eighth on the side, which will resist any machine-gun, rifle, or shrapnel fire. In other words, from the equipment standpoint we have greater potentialities than anybody in the world, because we have people in this country, I believe, who are more versed in that respect, and we hitch up with our engineers and with the manufacturers in this country in good shape. We can have a splendid entente all the way through, but we have, strictly speaking, to-day no up-to-date war equipment of any kind on hand capable of coping with a first-class power.

Mr. Olney. General, you spoke of a navigating personnel of 15,000. How many more men, including mechanicians, are needed with that number.

Gen. Mitchell. If you were to organize those persons into a service, you would take half of them for your active units and half of them in reserve, for operating that whole thing, including the training and everything else, you can take 7,500 and multiply it by 20, and that would give you the number of mechanics and the other people you would need for upkeep, and would be about the force you would need with field units.

Mr. Olney. That would be about 150,000 officers and men.

Gen. Mitchell. Yes; that is about what they had in the American Air Service during the war. Altogether, it was nearly double that.

Mr. Olney. I asked this same question of Assistant Secretary Crowell yesterday, and I would like to have your opinion about it. In the consideration of aviation matters would you not recommend that the pay of flyers and pilots, those in the air, be increased to the highest amount obtainable and possible, considering that locomotive engineers to-day are receiving salaries of $3,000.

Gen. Mitchell. The first thing I would increase would be the pay of the enlisted men on the ground. I would make it so that you could compete with the same class of work in civil life. In other words, I would fix the pay that those men should receive from time to time, because in no other department of the Army—it does not make any difference what it is, the same quality of work is not—I will not say necessary, but if a mechanic falls down on keeping a ship in shape your pilot is dead right there. There is

no come-back to it at all. It requires the greatest mechanical ability and the greatest attention to duty and minute detail, the combination of which is very difficult to get. That is the great difficulty we have in obtaining and maintaining men. They like the work, but if they only get half the pay or less than half in the Government service than they can get when they are outside, of course they are not going to come in. That is the proposition about that. All the nations, in so far as their navigating personnel is concerned, give a premium of pay in the Air Service over the other services. I think that same condition should obtain here. I think the conditions of pay that obtain here are, generally speaking, fairly satisfactory as far as the officers are concerned. An increase should be given to all officers in the services, however, on account of the decreased purchasing power of the dollar.

Mr. OLNEY. General, how well is Mexico prepared to fight in the air now, so far as you know.

Gen. MITCHELL. As far as Mexico is concerned, our reports are not very definite because we have not had an air officer down there to look over the proposition. We understand from reports that they have one airplane factory and one motor factory in the City of Mexico. Our reports were that they had 24 airplanes on an active status at Chihuahua several months ago, and still have some of them. We also understand they are attempting to import airplanes from Europe for the use of their army.

Mr. OLNEY. From what countries, do you know?

Gen. MITCHELL. We have heard from Germany and France. How true that is we have not been able to verify. We also have heard that German pilots were going down there, and that would be reasonable to suppose, because they are good and capable men for flying, and they are out of a job in their own country now, to some extent.

Mr. OLNEY. Has our military intelligence in Mexico been able to furnish you with information?

Gen. MITCHELL. They are trying to do all they can in that respect.

Mr. CALDWELL. General, you said you thought this new Air Service should have at the head of it a man who was a skilled Air Service man.

Gen. MITCHELL. I said that; yes, sir. I think that the man should know something about an Air Service.

Mr. CALDWELL. The head of the War Department has very seldom, in the history of our country, been an Army man.

Gen. MITCHELL. Yes, sir.

Mr. CALDWELL. And the head of the Navy Department, in the history of our country, has very seldom been a naval man.

Gen. MITCHELL. True.

Mr. CALDWELL. Why should a different rule maintain in relation to the Air Service than obtains with reference to the War Department or the Navy Department?

Gen. MITCHELL. Because an Army and a Navy have been institutions for ages and everybody knows something about them. An air service has only come into being very recently, and if you are going to start a department of that kind, you should get the greatest effi-

ciency in it possible, and therefore you should put some man in it that knows something about it, or at least is interested in it as a principal arm.

Mr. CALDWELL. That was the basis of your suggestion?

Gen. MITCHELL. Yes, sir; as a matter of fact, he should be a civilian, in my opinion.

Mr. CALDWELL. He should be a civilian, but should have air-service experience.

Gen. MITCHELL. Yes; he ought to know something about it. We have men of that kind now, and we do not want to complicate the establishment of any new arm like this by ignorance at the top.

Mr. CALDWELL. Do you think any of the failure of the Air Service during the war was due to the fact that an Army man was at the head of it?

Gen. MITCHELL. I think the failure of the Air Service during the war largely has been due to the fact that we had had very little experience with an air service, and we did not have a corps of officers trained in its handling or who knew very much about it. Yes; it was due to that fact, largely.

Mr. CALDWELL. Did the Navy have the same proportionate failure in its Air Service that the Army had in its Air Service?

Gen. MITCHELL. That is a question you had better ask the Navy.

Mr. CALDWELL. Well, you are a flyer and know something about what is going on. The question in my mind is whether if we must have an air man and the Army is not able to produce one and the Navy is, why should we not specify in the law that a naval man who had had air service should be at the head of the thing?

Gen. MITCHELL. We do not care where he comes from if he knows anything about it.

Mr. CALDWELL. You stated that at present there are in America about 15,000 men who can fly.

Gen. MITCHELL. Yes; either pilots or observers.

Mr. CALDWELL. How does that compare with all the rest of the world?

Gen. MITCHELL. I should say it was one-third of all the rest of the world.

Mr. CALDWELL. So that it is probably more than all of the allied forces combined?

Gen. MITCHELL. I think it is; yes, sir. Of course, if within five years those people are not organized they will be no asset to the country at all.

Mr. CALDWELL. I understand that. What I had in mind was the ability of America to produce an air force in time of stress.

Gen. MITCHELL. Now, we must remember that those persons have only had pilotage instruction.

Mr. CALDWELL. I understand.

Gen. MITCHELL. They have not had war instruction or duty with service units.

Mr. CALDWELL. You said we had practically gotten nothing since the armistice was signed; that is, nothing has been built. We gave you $15,000,000. What did you do with it?

Gen. MITCHELL. But you did not give it.

Mr. CALDWELL. Did we not give you——

Gen. MITCHELL (interposing). You appropriated $25,000,000.

Mr. CALDWELL. What has become of it?

Gen. MITCHELL. That has been used for storage and salvage and the disposition of the equipment on hand and for the maintenance of fixed assets. We have done some small work in the way of experimentation and the development of the new airplanes, motors, arms, etc.

Mr. CALDWELL. Why do they not start operations at the Wright-Martin plant in Long Island City, which you have money for?

Gen. MITCHELL. We have not money to go into production with any airplanes or motors on hand now.

Mr. CALDWELL. Then why does the Government keep that plant?

Gen. MITCHELL. As a fixed asset in case of necessity.

Mr. CALDWELL. Then the situation is that the War Department thinks you ought to have it and you people in the Air Service think you should not have it, and, consequently, it is not being operated?

Gen. MITCHELL. What is that?

Mr. CALDWELL. I say the War Department thinks we ought to have it and you people in the Air Service think we should not have it—should not operate it—and so it is of no use to us now, because it is not being operated.

Gen. MITCHELL. I think this, that if the Government owns it they should keep it—keep it in shape—so that it can be operated, whenever we can sell it or operate it in any other way to advantage. In so far as that particular plant is concerned, it could make the 340-horsepower Hispano-Suiza motors. We believe that the 340-horsepower motor is equal to or the superior of any other motor of the same kind anywhere, and that plant can turn them out.

Mr. CALDWELL. Have you had any advice in regard to or made any study of the power of Congress to control or regulate traffic in the air as distinguished from the power in the States in that respect?

Gen. MITCHELL. There is nothing specific on that proposition, although I believe Congress has complete jurisdiction.

Mr. CALDWELL. I do not recall any provision of the Constitution which gives us authority to do that.

Mr. FISHER. When did you first take charge of the work in which you are now engaged as Director of Military Aeronautics?

Gen. MITCHELL. On March 6, 1919. I was detailed as Director of Military Aeronautics. When the change was made and Gen. Kenley left the Air Service I was put in charge of the department of training and operations of the Air Service.

Mr. FISHER. Would you consider that since you have been in charge of that work our Government has made any progress whatsoever in the development of aeroplanes?

Gen. MITCHELL. There has been a good deal of progress, from an experimental standpoint, and some development by the Engineering Section.

Mr. FISHER. There has been some development?

Gen. MITCHELL. Yes, sir.

Mr. FISHER. Improvements and inventions in connection with things relating to the Air Service?

Gen. MITCHELL. Yes, sir. That is due very largely to the personnel that came back from Europe, who pushed the development of these matters.

Mr. FISHER. Personally, I am in favor of the adoption of a plan by Congress which will improve the Air Service, and I am looking for the right means. I want to find wherein we have been at fault, because I have understood that we had an air service during the war which was practically running itself as it pleased. Were you familiar with the working of the Air Service in this country during the war?

Gen. MITCHELL. Not to any great extent.

Mr. FISHER. You do not know anything about the board on which Mr. Howard Coffin was a member?

Gen. MITCHELL. The only knowledge was judged by what we obtained on the other side from this country.

Mr. FISHER. And that was not satisfactory; I mean the results were not satisfactory, so far as the furnishing of airplanes and pilots and the sending of them to France was concerned?

Gen. MITCHELL. In so far as the type of airplanes manufactured in this country was concerned they were not satisfactory.

Mr. FISHER. Do you attribute that to the work of the board of which Mr. Coffin was a member?

Gen. MITCHELL. I attribute the whole thing primarily to the fact that we had no air service in this country, no corps of trained officers. We had to do the thing as quickly as possible, and there was almost entire lack of liaison between the people serving on the front and the people in this country.

Mr. FISHER. Do you know of a single civilian who was familiar with airplanes who could have been called into the service, who could have performed the service on this board any better than the men who were placed on the board? Do you know of any number of such civilians?

Gen. MITCHELL. Very few.

Mr. FISHER. Is your criticism of the operation of the Air Service in this country directed to the personnel of that board? Do you think they were the wrong men for the job?

Gen. MITCHELL. I think in time of emergency you have to select men who seem the most able to deliver the goods at the time.

Mr. FISHER. We were then at the beginning of that work.

Gen. MITCHELL. Yes; and to create and organize an industry is one of the most difficult things to do. It is a maxim with all nations that a nation that is not ready with its air service at the beginning of a war never will be ready during the war.

Mr. FISHER. The suggestion was made that we are not sufficiently supplied with airplanes now in case an emergency should arise.

Gen. MITCHELL. That is the case, depending on the emergency.

Mr. FISHER. Do you attribute that to the failure of the present management of the Air Service in the War Department, or the failure of Congress to appropriate sufficient money?

Gen. MITCHELL. I attribute it to the fact that we have not a concrete air policy. We now have come out of the war and we must consider now what the various proportions of the Army and the Navy and the Air Service should be. Other nations have a consistent policy, which we have not.

Mr. FISHER. Were you and other officers of the Air Service before committees of Congress urging the appropriation of funds to buy more airplanes, to increase the number of airplanes we had?

Gen. MITCHELL. Yes, sir. The Secretary of War and I appeared before the Senate committee.

Mr. FISHER. And was the request denied by Congress?

Gen. MITCHELL. Yes, sir.

Mr. FISHER. If that money which was requested had been given, could the personnel of the present Air Service have operated those planes efficiently?

Gen. MITCHELL. Yes, sir; we only asked funds for airplanes which could be used by the men we had in the service.

Mr. FISHER. You were asking for machines which you thought would be sufficient for that work?

Gen. MITCHELL. For the use of the units we now have in the service.

Mr. FISHER. If the Air Service had been organized as you recommend, would the appropriation have been larger or smaller?

Gen. MITCHELL. Proportionately, it would have been smaller for the whole thing, that is, for the Post Office Department, the War Department, and the Navy Department. The original amount asked for by the Army and Navy for the year was about $130,000,000. I know that work could have been done for a much less figure under the proposed organization than is the case under the present organization.

Mr. FISHER. I was interested in your suggestion in reference to the dismissal or resignations of officers trained in that service and that it cost so much money for the training. What would be your recommendation, or your suggestion, as to what the War Department should have done with those men?

Gen. MITCHELL. My recommendation would be this: That we have a strategical organization of the country. That is, that the country should be redistricted from an air standpoint. Take, for instance, the district around Chicago, with the former officers residing in that area. They should be listed and asked if they would be willing, in case of war, to join the Air Service. At the same time, we should organize a reserve nucleus there by keeping an airdrome where we would have and keep airplanes available for them to fly in, making use of the old equipment which we have on hand. At the same time those airdromes should serve as landing places for civilian or commercial airplanes and also be used for supplying airplanes with gas and other necessary things.

Mr. FISHER. As far as the officers who have been discharged are concerned, they are really in the Reserve Corps, are they not?

Gen. MITCHELL. No; some few of them have joined the Reserve Corps—about 1,700.

Mr. FISHER. Do you know what percentage of flyers have joined the Reserve Corps, and what percentage have declined to join the Reserve Corps?

Gen. MITCHELL. I should say that about 12 per cent have joined.

Mr. FISHER. Have you any data as to the number of former flying officers who have been, since they were discharged from the Army, and who are now engaged in civilian flying?

Gen. MITCHELL. A small proportion; not to exceed 3 or 4 per cent, I believe.

Mr. FISHER. Was there any appreciable percentage of those men who went into the service of the Post Office Department?

Gen. MITCHELL. The Post Office Department service is so small it is almost unappreciable, as to personnel, but as to what they are doing and developing it is very great and very well handled under the direction of Mr. Praeger.

Mr. FISHER. What have you to say as to whether the flying officers, as they become older, are not efficient flyers or are not as efficient as they ought to be for active service? What effect does the age have in that case?

Gen. MITCHELL. The similarity is something the same as in the case of an Infantry soldier, where a man is not as good at carrying a pack on his shoulder when he gets older as he was when he was 20 years of age. But the flying would be kept up right straight through, and the longer an officer is in the service, if he is efficient, the more will he be valuable and be able to handle an air unit. It is necessary to retain them in the service as long as their ability is great enough. I believe a man can fly up to the time he is 60 years of age.

Mr. CALDWELL. That is a new idea, is it not?

Gen. MITCHELL. I do not know that it is particularly new; we have not aviation long enough. During the war the French had a man flying at 57 years of age on the front. We have one 48 years old who flies pursuit ships.

Mr. FISHER. Has it not been the fixed policy not to take men under 30 years of age?

Gen. MITCHELL. That was the policy before the war. I believe that when a man first comes into the service he should be a young man, much less than 30.

Mr. FISHER. It is your idea that in time of an emergency, so far as combat work, battle work is concerned, the flying men can do efficient work up to 60 years of age?

Gen. MITCHELL. I believe that they can in the same manner as men in any other branch of the service, the smaller the command the younger and less experienced the man should be. Our best pilots in Europe were from 25 to 30 years of age.

Mr. FISHER. But you consider the matter of age as vital when a man enters the service, or at the beginning of a war?

Gen. MITCHELL. It makes a difference with the pilots that are engaged on the line; these should be young. In so far as the direction of air units is concerned and the handling of the service, that requires the knowledge of men who have had long experience. You can have that only in a graded service, just as is done in the case of the Army and the Navy, men who have made a career and business of it.

Mr. FISHER. You are familiar with the program of the War Department as to the number of air fields throughout the country?

Gen. MITCHELL. Yes, sir.

Mr. FISHER. Do you consider it vital to the success of aviation in the future that those fields be acquired and paid for by the Government?

Gen. MITCHELL. I think the most vital thing is to get all the weapons you can for use in the air, such as airplanes and their accessories. I think the Government has spent so much money on these fields——

Mr. FISHER (interposing). That the purchase ought to be completed?

Gen. MITCHELL. Yes, sir. As I understand it, by the expenditure of $1,300,000 proprietorship in those fields can be vested in the Government. I believe on that basis it is a good proposition to acquire those fields.

Mr. FISHER. I want to ask you a question in connection with the suggestion relative to the shipment of airplanes into Mexico. Would the change from the present management of the Air Service affect the possibility of getting accurate information as to what is being done so far as the air service in Mexico is concerned?

Gen. MITCHELL. Yes, sir; because we would maintain our attaché in that country as the military and naval attachés are maintained now. The other nations have their attachés who not only pay attention to every detail of the air service in the various countries, but who act as agents for the introduction of their material and for the sale of the products of their industries at home, so as to maintain them.

Mr. FISHER. Would you not be dependent upon the Intelligence Service in the end?

Gen. MITCHELL. Our attachés would be a part of the Intelligence Service in this case.

Mr. FISHER. I would like to find out just what would have been the difference, in your judgment, if we had had a separate air service during the war, as to what was done by us during the war, when those in control were doing everything on earth that they could do, with unlimited means at their disposal and unlimited authority; because I am advised that no reasonable request made by them was ever refused. They were engineers of experience, and the Government had the advantage of the best talent it could use. Wherein would the existence of a separate air service have changed the situation?

Gen. MITCHELL. I believe a united air service——

Mr. FISHER (interposing). But they were united; that was a strong feature of the situation which they presented to Congress and to the country, that they had men there representing the different branches, who united all the branches so far as combatant work was concerned, and they were given unlimited authority.

Gen. MITCHELL. They were not united. There was the Army and there was the Navy——

Mr. FISHER (interposing). But there was an Army man and a Navy man on that board, and they worked together in harmony.

Gen. MITCHELL. They did not.

Mr. FISHER. They did not work in harmony?

Gen. MITCHELL. No, sir.

Mr. CALDWELL. Were you here in the United States and familiar with the conditions?

Gen. MITCHELL. I was in Europe at that time.

Mr. CALDWELL. Then you are not in a position to say whether or not they functioned; you are not in as good a position to say that as Gen. Kenly, Gen. Menoher, or Gen. Squier.

Gen. MITCHELL. I am in a position to judge how that material was delivered in Europe, and whether or not it was delivered at the front.

Mr. CALDWELL. You said they did not operate together. In what respect?

Gen. MITCHELL. In that there were two different entities handling aviation, one the Army, and the other the Navy.

Mr. CALDWELL. You said they did not operate together. In what particular? You are charging men with dereliction of duty.

Gen. MITCHELL. No; I am not. I did not say they were derelict in their duty. I said the two services did not operate together, and they could not because both were competing very largely for the same thing.

Mr. FISHER. My question was in regard to the direction of the work of aviation. This board had absolute control. They were absolute dictators, even so far as the matter of the planting of castor beans throughout the world was concerned. That was given as an example of the supreme authority they had. They could have had plantations in the South Sea Islands producing castor beans.

Gen. MITCHELL. The only coordinating body that actually had any authority was the War Industries Board, which apportioned the raw materials to the various branches of the service. When it came to the question of operation between the Army and the Navy, although the Army and the Navy had liaison, they had their own views and ideas as to the development of their respective air services. When the material and the personnel reached Europe they organized it and used it very largely as they saw fit. The result was when we were striving to obtain a decision in one place a great deal of the material was dispatched to places that were not where a miximum decision was being sought. I am speaking particularly of the organization the Navy attempted to create for use on land. That should have been applied where the maximum decision was being sought.

Mr. FISHER. Considering now the number of industries in this country turned over for the manufacture of airplanes and the great possibilities there are for manufacturing them now, brought out by the late emergency, how long would it take—supposing we had a separate Air Service—to produce airplanes sufficient for such a great emergency?

Gen. MITCHELL. About a year and a half or two years, at least.

Mr. FISHER. How much longer would it take with the present arrangement as it stands now?

Gen. MITCHELL. If you gave the orders the difference in time would not be very great.

Mr. FISHER. There would not be much difference?

Gen. MITCHELL. There would not be much difference; but if you had a combined outfit, wherein some of the work was for the Navy, some for the Army, and some for the Post Office Department, they might be combined to better advantage and with a more definite policy.

Mr. FISHER. I was interested in your suggestion that the Government should not have anything to do with operating factories.

Gen. MITCHELL. We believe it to be a wrong principle for the Government to own and operate factories for the production of material where any other means is available for that purpose.

Mr. FISHER. You would eliminate that production from a separate air service?

Gen. MITCHELL. Of course.

Mr. FISHER. And simply have experimentation sufficient to keep up your factories?

Gen. MITCHELL. Yes; but only have experimental plants.

Mr. FISHER. And not manufacture anything at all for the use of the Army?

Gen. MITCHELL. I mean production in great numbers. We could make some models.

Mr. FISHER. Then, upon what would we depend for our airplanes in case of emergency?

Gen. MITCHELL. If you do not foster the civil industry you would have to depend on foreigners, because you never could keep up a Government plant sufficient for the production of the great number of planes necessary in case of emergency.

Mr. FISHER. Then we would be dependent upon private interests again?

Gen. MITCHELL. You have to be dependent upon private interests in the end for anything the Government needs in great quantity.

Mr. FISHER. Are you in favor of subsidizing airplane factories?

Gen. MITCHELL. Indirectly subsidizing them by giving them orders for construction.

Mr. FISHER. Are you in favor of going the limit and subsidizing them so they can sell their planes at less than cost in other countries?

Gen. MITCHELL. I am in favor of doing it indirectly by the establishment of fields throughout the country at which pilots could get their fuel and spare parts for their planes at cost. I would also make available all the engineering data which the Government has, supplying it to the factories so that they could use it and get any data they wanted for specific work.

Mr. FISHER. Then, except for experimentation, we would be again back where we were at the beginning of the war?

Gen. MITCHELL. No; because you would know what kind of equipment you would need and you would have developed certain types.

Mr. FISHER. How much money do you think it would require to subsidize the factories in the way you suggest, so that they would be able to furnish the airplanes needed by the Army and the Navy in case of an emergency?

Gen. MITCHELL. I think you could outfit the Government with sufficient airplanes for all uses for next year—the Army, the Navy, the Post Office Department, and all other activities of the Government—for about $80,000,000; and after that I think an annual appropriation for the construction of airplanes of $50,000,000 would cover it very well.

Mr. LAGUARDIA. Have you read Assistant Secretary Crowell's report?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. And you agree with that?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. Along the line of commercial aviation the assistance which you suggest is not in the nature of a subsidy at all?

Gen. MITCHELL. No; it is not a subsidy in the way we usually apply that word.

Mr. LAGUARDIA. It is the indirect assistance which the manufacturers of the country would have by receiving advice from a well-

equipped technical board, with the benefits of experiments conducted by a united service, the results of the tests of material, and things of that sort, which would in a large measure assist them?

Gen. MITCHELL. Very much in the same way as the Agricultural Department gives out data as to what different kinds of soil can produce.

Mr. LAGUARDIA. In the matter of pilots is it not true that it is very essential to flying to keep in trim and in training at all times?

Gen. MITCHELL. Yes, sir; it is.

Mr. LAGUARDIA. With a united service and proper fields scattered all through the country we could provide for a large corps of reserve fliers, without having them actively connected with the establishment, but have them fly at regular intervals at these fields?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. At the present time there is no provision made for those boys to fly unless they happen to be near a flying field.

Gen. MITCHELL. Even then they are not authorized to fly unless they are reserve officers.

Mr. LAGUARDIA. We have not sufficient equipment if we had a large number of reserve officers scattered through the United States?

Gen. MITCHELL. We have not sufficient service equipment.

Mr. LAGUARDIA. That is what you meant by your reference to the loss of ability of 15,000 fliers at this time?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. In reference to the proper control of flying equipment, what you had in mind was that under proper control, with proper inspection and the testing of pilots, a disaster like the Chicago disaster would probably not have happened?

Gen. MITCHELL. Exactly. You would inspect the equipment and personnel and see that the personnel was capable of handling the ships, and if the ship landed at a Government airdrome you would see that its navigating personnel was capable of handling it and taking it out.

Mr. LAGUARDIA. You made reference to observation work directly connected with the Army and the Navy. As a matter of fact, is it not true that the machine which makes observations is the same type of machine which would be used by the Air Service?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. Its construction and its maintenance and the man who flies a machine would be naturally a part of the Air Service?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. So that the Army and the Navy would require you to train observers as they desired them trained—for the direction of artillery fire—and ask the united Air Service for so many machines to carry on that work?

Gen. MITCHELL. Exactly. They would specify the number of organizations they wanted and they would be taken out of a central reservoir of personnel and matériel.

Mr. LAGUARDIA. You said there was very little air fighting over water and that what there was was conducted by landplanes?

Gen. MITCHELL. Yes, sir; very largely.

Mr. LAGUARDIA. And, assuming that it is pursuit flying, the training is exactly the same, whether the aviator flies over land or water?

Gen. MITCHELL. As far as the tactics of the air force and the handling of the organization are concerned, it is exactly the same.

Mr. LAGUARDIA. General, you stated that it is necessary to keep the men in the service. Do you approve the suggestion made by the Chief of Staff advising a system of detail of four years to the Air Service and then two years back to the line?

Gen. MITCHELL. I believe any system of detail which does not make a career for the men entering the Air Service to be entirely wrong. You will not be able to make a corps of air officers in that way. I think it has been amply proven by the results we have had so far. I believe it is essential if a united air service is formed, that there be an exchange of certain officers between the Army and the Navy from time to time so that the three branches of the service may keep familiar with each other's needs.

Mr. LAGUARDIA. In urging a united air service I am sure none of us is interested in that because of any particular personal reason, and it would make no difference whether the man in charge was a civilian or an Army or a Navy officer, so long as he was the right sort of a man.

Gen. MITCHELL. It would not make a bit of difference.

Mr. LAGUARDIA. You testified about improvement made in models, in planes, and in guns. To make it perfectly clear to the committee, these improvements were limited to experiments and models; none of them are in production.

Gen. MITCHELL. No, sir.

Mr. LAGUARDIA. The same thing applies to guns?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. Do you know why an Air Service officer has not been assigned to the Military Intelligence Department in Mexico?

Gen. MITCHELL. No, I do not know that, but I believe it due to shortage of personnel and funds.

Mr. LAGUARDIA. Are you aware of the fact—speaking about Mexico—that it is getting its equipment from Europe; are you aware of the fact that Aguilar, who was the special envoy of Carranza in this country, whom I mentioned in my speech in July, left this country for Europe, ostensibly for the purpose of going to Europe for medical treatment, and was equipped with credentials as an envoy and went to Italy incognito, that through a letter being directed erroneously, addressed to the United States of Mexico, this letter came into the hands of our embassy at Rome, and Mr. Peter Jay, our chargé de affairs, called upon Premier Nitti, of Italy, to inquire the purpose of Mr. Aguilar in Italy, and obtained information that Aguilar was trying to buy arms, munitions, and air equipment, and that Premier Nitti assured Mr. Jay that Italy refused to sell any to Aguilar; that that information was communicated to the State Department; that Mr. Aguilar then left Italy and later we learned he had succeeded in purchasing a large amount of guns and ammunition from the Liege munitions factory in Belgium and we succeeded in stopping the shipment of that purchase. Are you aware of that?

Gen. MITCHELL. I had heard it rumored that something of that sort had been gone into, but not specifically.

Mr. LAGUARDIA. Mr. Caldwell asked you why it was that there should be any difference in the appointment of a man at the head

of the Air Service, that there should be a man at the head of the Air Service who was an expert on air matters, while at the head of the Army and the Navy we had a custom in this country of putting men at the head who were not experts in those respective departments. Would it not be a good thing if we did have as the heads of those departments civilians who were familiar with those respective military establishments?

Gen. MITCHELL. I think in times past nearly every Secretary at the head of those departments has had military training, up until the last 15 or 20 years, because they had served in one of our wars; and I think that will be the case in the future.

Mr. LAGUARDIA. Is not the Air Service different from the Army and Navy in this respect, that it is new, and also in the fact that the biggest problem, so far as the air is concerned, is not flying or fighting, but the industrial problem back of that, which is still in an experimental stage?

Gen. MITCHELL. I should say both were of coordinate importance; both of them are extremely important.

Mr. LAGUARDIA. Did we not fall down entirely on production, as far as we who were on the other side saw it?

Gen. MITCHELL. Very largely so, due to shortage of time.

Mr. LAGUARDIA. And in judging results on this side all we could judge by was what materials came to the other side and what failed to come?

Gen. MITCHELL. That is correct.

Mr. LAGUARDIA. I think you addressed your criticism——

Gen. MITCHELL (interposing). Of course, the difficulty of organizing production for aviation must be taken into consideration. It takes a long time to organize. We have had an example in times past as to how long it takes to start it.

Mr. LAGUARDIA. Referring again to a question asked by my colleague, Mr. Caldwell, although we created an Aircraft Production Board, is it not true that according to a decision rendered by the Judge Advocate General, which I am going to put in the record, that board was held to have advisory powers only and nothing else?

Gen. MITCHELL. So I have understood.

Mr. LAGUARDIA. I will put that decision in the record.

In reference to the question asked by Mr. Fisher, the $15,000,000 which you referred to was the $15,000,000 in the deficiency bill?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. That was was a lump sum?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. And it was not specified what was to be done with it?

Gen. MITCHELL. Not in the act. The estimate specified that.

Mr. LAGUARDIA. You can understand the feeling of Congress in giving lump sum appropriations for aviation, basing the judgment upon past performances.

In reference to civilian flying, is it not true that with a properly equipped air service we could assign to other activities, such as the Post Office Department, the Geodetic Survey, the Forest Patrol, and the Coast Patrol, a large number of men and planes and in that way keep them in good condition, rather than have them make circles over a field?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. And that could be done with almost no additional cost to the Government?

Gen. MITCHELL. You could get a more economical return from an air unit that way than from any other military branch of the service, I believe.

Mr. LAGUARDIA. In reference to the age of a pilot, what you had in mind was that if a man is kept in the service, and if he has had years of experience as a flier he would develop into a very useful officer in other branches of services even though his flying days were over?

Gen. MITCHELL. We should have a line and a staff in the Air Service, just as we have a line and staff in other units.

Mr. LAGUARDIA. Getting back to the question of cooperation with the Navy, of course the relations between Army and Navy aviation were always friendly?

Gen. MITCHELL. Oh, yes.

Mr. LAGUARDIA. Is it not true that they had a base at Poliac, on the French coast?

Gen. MITCHELL. Yes, sir; I believe so.

Mr. LAGUARDIA. With a united air service the overhead at Poliac and the overhead of the other separate air commands in France and a great deal of other expense of that kind could have been eliminated?

Gen. MITCHELL. A great deal of it could have been.

Mr. LAGUARDIA. The greatest undertaking of naval aviation was what was known as the northern bombing object. Is it not true that land planes were used in the northern bombing object?

Gen. MITCHELL. Land units were used entirely.

Mr. LAGUARDIA. And are you aware of the fact that in order to obtain planes at one time they went to the source where the Army had purchased planes and doubled the Army price in order to get them?

Gen. MITCHELL. I know they used the same source as the Army had, and when we could not get pilots on the front I understood that they had an excess of pilots in Europe.

Mr. LAGUARDIA. While they were waiting for these bombing planes and we were trying to get them, and after a conference in Paris, where we decided not to bid against each other, they had a large number of pilots waiting for these planes, and that was the time when you were crying for pilots, just previous to the St. Mihiel offensive?

Gen. MITCHELL. Yes; during the St. Mihiel offensive and the Argonne drive. We had more ships then than we had pilots.

Mr. LAGUARDIA. That was the time when you asked for pilots and you received a telegram from the then Chief of the Air Service telling you to go slow?

Gen. MITCHELL. We were told that repeatedly, all the time.

Mr. LAGUARDIA. I saw that telegram in Paris.

It is the object of this committee to get the views and to have as witnesses only men who are experts in their line. I have called this morning to testify on the matter of training Col. Milling. You are acquainted with Col Milling?

Gen. MITCHELL. Yes, sir.

Mr. LaGuardia. He was in charge of training in the American Expeditionary Forces when we started?

Gen. Mitchell. Yes, sir. He was one of our original fliers. He has been flying constantly since 1911.

Mr. LaGuardia. And established a record in the first cross-country flight?

Gen. Mitchell. Yes, sir; he has held several world records in times past. He originally had charge of the training in Europe. Then he went as our representative on the General Staff. Then he commanded a wing in the Air Service and then later commanded the Air Service of the First Army.

Mr. LaGuardia. He will give us valuable testimony.

Gen. Mitchell. He is perfectly capable of doing so.

Mr. LaGuardia. On the feature of the tactical use of aircraft we have called Col. Sherman. Are you familiar with his record?

Gen. Mitchell. Yes, sir. He began flying shortly after Col. Milling began, and he was Col. Milling's observer in the record cross-country flight. He went over with the First Division, was first with Gen. Sibert. He stayed with the First Division in various capacities, in the Information and Operations Departments, and then he went with the Third Corps, with Gen. Bullard, and from there he came back and was the chief of staff of the Air Service of the First Army.

Mr. LaGuardia. I show you a memorandum signed by R. L. Bullard and ask you if that is a paper you received?

Gen. Michell. Yes, sir. Gen. Bullard has told me he considered Col. Sherman one of the most capable officers they had.

Mr. LaGuardia. I will put this memorandum in the record and also another memorandum by Gen. Bullard to The Adjutant General, recommending Col. Sherman for a distinguished service medal.

(The papers referred to are as follows:)

Memorandum to Gen. Mitchell.

Subject: Lieut. Col. W. C. Sherman, civil engineer, Air Service.

Lieut. Col. Sherman served under my immediate command in France (1) as G 2, First Division, January 1 to July 14, 1918; (2) as assistant in G 2, G 3, and Air Service, Third Corps, September 1 to about October 10, 1918.

In the first, his services were inestimably valuable and efficient, near perfect, beautifully systematized, and skillfully worked. The French who relieved him in July marveled at it. See attached copy of recommendation for distinguished-service medal.

In the second, his services were no less efficient and valuable. He was mainly charged as assistant with G 3 with the placing in position of 350,000 troops for the battle of the Meuse-Argonne. During the early part of the battle and until called to other duties his efficient services in all the capacities shown in 2 were positively consoling to me as commander of his corps. I turned to him instinctively for help.

This officer merits highly, highly, of his country.

R. L. Bullard, *Lieutenat General.*

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309 Mills Building,
Washington, D. C., June 27, 1919.

From: Lieut. Gen. Robert L. Bullard, United States Army.

To: The Adjutant General United States Army.

Subject: Recommendation for distinguished-service medal for Lieut. Col. W. C. Sherman, civil engineer, Air Service.

I recommend him for the distinguished-service medal.

Citation.—Exceptionally meritorious and distinguished service: skillful organization and direction of the service of information of the enemy for his divi-

sion for the engagement at Cantigny. France, largely contributing to the capture and holding against desperate hostile assaults of that place and the consequent heightening of the morale of the troops not only of his own but of all the allied countries.

Basis of citation.—Lieut. Col. Sherman was the G 2 of the First Division. It was the first organized divisional service of information of the enemy. He organized and directed its operations. He put the organization upon the ground as well as upon paper in such detail that the whole field of operation of his division and of any hostile attacks were covered. Before Cantigny he put his machine to work and got for his division valuable information of the location of the enemy's troops and his probable reaction in the contemplated attack of the First Division against Cantigny. This information was used in the preparation and execution of the attack and capture of Cantigny. During the actual attack between Cantigny and for four or five days thereafter, during which the enemy made repeated (four to six) counter attacks, hoping to recover lost ground, Col. Sherman's organization continued to function and furnish valuable information of the enemy's efforts. This information enabled timely provisions to be made and all hostile efforts repulsed. Cantigny was held. The gain in morale of the troops of all the Allies resulting from this operation is to-day known all over the world. Col. Sherman's machine was one of the main factors in making Cantigny a success.

ROBERLT L. BULLARD,
Lieutenant General, United States Army.

Mr. LAGUARDIA. I am going to ask Col. McDill to testify on the use of the Air Service for coast defense. How long has he been in the service?

Gen. MITCHELL. He has been in the service about seven years. He was in Europe and also has charge in this country of the aerial coast defense work and has specialized on the use of the Air Service from the standpoint of coast defense.

Mr. LAGUARDIA. You consider him an expert along those lines?

Gen. MITCHELL. Yes. sir.

Mr. CALDWELL. General, I have before me the law we passed in the Sixty-fifth Congress at the time we started to have an army in the air. I want to read some of the paragraphs to you and ask if the circumstances they indicate have made any considerable difference in creating this kind of an organization.

That for the purpose of expanding and coordinating the industrial activities relating to aircraft, or parts of aircraft, produced for any purpose in the United States and to facilitate generally the development of air service.

Do you know of any other purpose we could have an air service for?

Gen. MITCHELL. That was a coordinating and advisory board, was it not?

Mr. CALDWELL. You do not get my question. Do you know of any other purpose we could have an air service for except the purposes indicated there; that is, for the purpose of extending and coordinating industrial activities relating to aircraft or parts of aircraft, or for any purpose in facilitating the training and development of the Air Service?

Gen. MITCHELL. The purpose is very good; there is no doubt about it.

Mr. CALDWELL. You have no criticism to make of that?

Gen. MITCHELL. Not of the purpose.

Mr. CALDWELL. It says further, "That the board shall number not more than nine in all." Do you think there was a mistake in limiting it to that number?

Gen. MITCHELL. Yes, sir; I think it is too big; I do not think it ought to exceed five under any conditions.

Mr. CALDWELL. You think there was a mistake made in putting four additional members on that board?

Gen. MITCHELL. Yes, sir.

Mr. CALDWELL. It further says, "Shall include a civilian chairman." You are opposed to a civilian chairman?

Gen. MITCHELL. Not at all.

Mr. CALDWELL. Do you think that was right?

Gen. MITCHELL. That was all right, sir.

Mr. CALDWELL. It further says, "The Chief Signal Officer;" that means the head of the Aviation Service. Do you think that was a mistake?

Gen. MITCHELL. No, sir.

Mr. CALDWELL. It further says "of the Army and two other officers of the Army;" do you think a mistake was made in putting on two other officers of the Army?

Gen. MITCHELL. They only needed one other; the fewer the better in all such undertakings.

Mr. CALDWELL. It further says, "To be appointed by the Secretary of War." Was that a mistake?

Gen. MITCHELL. No, sir.

Mr. CALDWELL. It further says, "The Chief Constructor of the Navy." Was that a mistake?

Gen. MITCHELL. No, sir.

Mr. CALDWELL. It further says, "and two other officers of the Navy;" you think one would be enough there?

Gen. MITCHELL. One is enough.

Mr. CALDWELL. It further says, "To be appointed by the Secretary of the Navy;" do you think that was a mistake?

Gen. MITCHELL. No, sir.

Mr. CALDWELL. It further says, "and two additional civilian members." Do you think they were dead timber?

Gen. MITCHELL. Largely; I think one is enough.

Mr. CALDWELL. So that would be three, and your suggestion that five would be sufficient would be a mistake, because that would give us six.

Gen. MITCHELL. Then you ought to cut one of them out.

Mr. CALDWELL. Which one would you cut out?

Gen. MITCHELL. Any of them; it does not make any difference.

Mr. CALDWELL. Would you cut out the Chief Signal Officer?

Gen. MITCHELL. Yes, sir.

Mr. CALDWELL. And have one officer from the Army and two from the Navy?

Gen. MITCHELL. One from the Navy would be enough.

Mr. CALDWELL. Then you think four is enough?

Gen. MITCHELL. So long as each department is represented.

Mr. CALDWELL. The act further provides that the civilian members should be appointed by the President. Do you think it was a mistake to have the civilians in there?

Gen. MITCHELL. I do not. I do not think it was a mistake but a necessity to have civilian members on that board, but they ought to know something about the work they are called on to do.

Mr. CALDWELL. I do not want to heckle you. You ask us to change a system provided for by a law now on the books, and you have undoubtedly made some study of the subject, and, of course, if you have made a study of it, you have undoubtedly examined this act; or have you examined the act?

Gen. MITCHELL. I have examined the bill introduced by Mr. Curry——

Mr. CALDWELL (interposing). I am talking about the act on the statute books that you want changed, the act passed in the Sixty-fifth Congress. Have you studied that?

Gen. MITCHELL. Yes, sir.

Mr. CALDWELL. I want to find out what is bad about this act, if I can, if you have any ideas about it. But if you do not want to discuss it, I do not want to press the inquiry.

Gen. MITCHELL. If you will allow me, I will make a statement on that. When we went into the war the air services were not regarded in the same way by the various countries as they were at the end of the war. To begin with, the Air Service was regarded as an auxiliary for observation purposes alone for troops on the ground or on the water. But as it increased fighting began in the air between airplanes of each plane, and there grew up two branches of the Air Service.

Next, after that, it was determined that from their standpoint the Air Service was practically the same, no matter where it was, whether it was over the water or over the land. That led to a coordinating board in each country. The British had it and the French had it. They were similar to our board that you speak of. At that time the idea was not bad, except that I do not think it had enough punch or power of execution. There was no single person that could be held responsible for the whole air program.

Now, the thing has gotten where the situation is that the Air Service has ceased to be an auxiliary service; that it is the principal means for the destruction of the hostile air force, and therefore we ask you to make an arm and do away with these coordinating means and make it an actual army in the air, as the development of air power has shown to be necessary.

Mr. HULL. General, you stated you were not thoroughly posted in regard to how many planes the Mexican Government had or what the development is down there; is that correct?

Gen. MITCHELL. That is correct.

Mr. HULL. Have you consulted the Military Intelligence Department?

Gen. MITCHELL. Yes, sir.

Mr. HULL. They do not know?

Gen. MITCHELL. They have difficulty in finding out.

Mr. HULL. They do?

Gen. MITCHELL. Yes. If we had our attaché down there, I believe we could get more definite information.

Mr. HULL. If we have to have a Military Intelligence Division in every department of the Army——

Gen. MITCHELL (interposing). That is one reason why we urge a united service.

Mr. HULL. I want to ask you another question. It is a very big question. I do not know that I want to go into it in detail. It is

one of the big questions of the world to-day; that is in regard to private manufacture.

In the league of nations covenant, which I presume some day will probably be made something of, there is a provision that in the future the nations shall manufacture their own munitions publicly, in public arsenals. You know that?

Gen. MITCHELL. I have read that.

Mr. HULL. What do you think of that provision; if that was put in there how would you go ahead and subsidize industry in connection with the manufacture of munitions?

Gen. MITCHELL. In so far as industry is concerned in connection with aircraft, they would be manufactured by private individuals or concerns for commercial purposes and would not be munitions in that sense any more than ships that carry cargo would be.

Mr. HULL. You do not intend to buy of the industry?

Gen. MITCHELL. We do intend to buy of the industry.

Mr. HULL. Are you purchasing at present?

Gen. MITCHELL. Purchases from private industry are made at present.

Mr. HULL. You know that in the Army appropriation bill there is a provision that compels you to manufacture, if you can?

Gen. MITCHELL. I am not familiar with that in the Air Service bill.

Mr. HULL. It is in the Army appropriation bill, every item in the bill is subject to that.

Mr. LA GUARDIA. When you can.

Mr. HULL. That is all that should be there.

Mr. LAGUARDIA. We have not any facilities now to make them cheaper.

Mr. HULL. I am not saying they ought to do it, but I do want to call attention to this, that when we put a provision of that kind in the bill it is not up to you fellows to sidestep it. It is there; it is the law.

Gen. MITCHELL. Nothing is sidestepped in any shape or form, either in spirit or in any other way.

Mr. HULL. I have understood the Air Service have said they would go ahead and purchase what they wanted, and that they were not subject to it, and your answer leads me to believe that you think that yourself because you referred to the Air Service bill.

Gen. MITCHELL. As far as my department is concerned we have nothing to do with funds, their expenditure or control. I am telling you what I believe should be the case, irrespective of what other people's opinions may be. Any law which has been passed will be executed according to its provisions. So far as my opinion is concerned, I believe it is very shortsighted governmental policy to require that the Government manufacture its munitions in toto.

Mr. HULL. But suppose it can be done cheaper?

Gen. MITCHELL. It does not make any difference how it can be done, and it will not be cheaper in the end, because you will have to put in more overhead than——

Mr. HULL (interposing). With present facilities?

Gen. MITCHELL. There is no question about that.

Mr. LaGuardia. Have we enough men in the Air Service now in our plants to-day to put out a turnbuckle?

Gen. Mitchell. No; we could put out a turnbuckle, but not put them out in quantity.

Mr. Hull. That is not the proposition at all.

Mr. LaGuardia. What the act provides is that if the Government can in its plant produce them cheaper.

Mr. Olney. The Government can not do that.

Mr. Hull. You read the report of the board of officers made up of Gen. Haan, Gen. Snow, and other general officers on the Air Service?

Gen. Mitchell. Yes, sir.

Mr. Hull. What do they contemplate as a future appropriation?

Gen. Mitchell. They contemplate a very much larger appropriation than I mentioned. They contemplate a total appropriation of $300,000,000.

Mr. Hull. Every year?

Gen. Mitchell. To be distributed over a certain time.

Mr. Hull. No; $300,000,000 a year for 10 years, a total of $3,000,000,000; that is what they contemplate. That is what they say in their report is necessary to establish the industry.

You will admit, I take it, that you had a billion six hundred million during the war?

Gen. Mitchell. I understand that was appropriated by Congress, but all of it was not used. A great proportion of it was used.

Mr. Hull. And at the time of the armistice we did not have any of the pursuit planes to speak of.

Gen. Mitchell. That is because they were not put in production in this country.

Mr. Hull. And we have not any as yet?

Gen. Mitchell. No; we have not any American ones.

Mr. Fisher. I want to find out about the $15,000,000 denied by Congress to the Air Service. Did you and the other officers in charge of the work of the Air Service present plans and specifications to the committees of Congress urging that this sum be appropriated?

Gen. Mitchell. The Secretary of War and myself appeared before the Senate committee.

Mr. Fisher. And you presented a strong case?

Gen. Mitchell. As strong as we could put it.

Mr. Fisher. For an increased number of airplanes?

Gen. Mitchell. For purchasing up-to-date airplanes for the equipment of the squadrons we now have in the service.

Mr. Fisher. And you have not been able to purchase them because you did not have that money?

Gen. Mitchell. That is true.

Mr. Fisher. What probability would there be of coordination and cooperation among the different departments, the Army, the Navy, and the other departments, provided we had a separate Air Service, and at the same time keeping up a high standard of efficiency of the Air Service, in case we adopt a measure providing for a separate Air Service? Whatever you might have to say about that would have more weight than the statement of any other single officer, because of your experience and your knowledge of the subject.

Gen. MITCHELL. I believe you would get greater efficiency by having such an organization.

Mr. FISHER. I believe that is admitted by everybody, but I would like to know what you have to say on the question of coordination and cooperation among the different departments.

Gen. MITCHELL. The question of command is raised. That is to say, if you unite your air services the command would not be exercised by the commanding general or the commanding admiral of the Army or fleet that was operating. I believe that is more beside the point than any other argument that has been advanced against a united service, because every bill that has been proposed and every arrangement that has been proposed makes the air force while assigned to duty with either the Army or the Navy entirely under their tactical direction and their disciplinary rules and regulations, and while so acting, of course, is entirely turned over to their war use. There can be no more question about that than in a case of the Marines who served in the Second Division of the Army at Chateau-Thierry.

We have an example similar to that in the case of the British air service, which was handled in that way. When their united air force was created it did not alter their relation with the troops at all, but it improved their efficiency, because they got better equipment and their personnel was better distributed all the way through. The united air force has done very well in England.

Mr. FISHER. I do not believe we can get anywhere in promoting a separate air service if we base our sole reasons upon the argument that there were certain defects in our air service during the war.

Gen. MITCHELL. You are absolutely right about that.

Mr. FISHER. I think our case will rest upon what you have to say along the lines of cooperation and efficiency.

Gen. MITCHELL. It is a constructive proposition, looking to the future that we must consider.

Mr. FISHER. I think it is a mistake to rest the case on any other than the basis of constructive legislation. And right there I want to ask another question relative to the production of airplanes during the war.

We had men over here straining every effort to produce airplanes, loaning private industries millions of dollars, and millions of dollars were spent. Then by a cable message from France all that money was practically thrown away because they were ordered not to produce any further. You say the design and type of airplanes and the art of making airplanes are advancing all the time?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. In reference to the matter of air attachés, England has a general officer here as an air attaché?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. And Italy has a captain?

Gen. MITCHELL. Yes, sir; and I hear they are going to send an officer of higher rank.

Mr. LAGUARDIA. And France has a capitan?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. Those are in addition to the regular military attachés and their staffs?

Gen. MITCHELL. That is correct.

Mr. OLNEY. General, it is my opinion that private industry can produce airplanes cheaper than Government arsenals or Government factories, due to the fact that the Taylor efficiency system has been taken out of the Government institutions, and also on account of the fact that employees in Government institutions have a 30 days' vacation. I think you should not be restricted in the manufacture of airplanes to making the planes at the Government factories, and it seems to me that the sooner we get away from the Government ownership idea the better.

Gen. MITCHELL. We have an example of the Government ownership of airplane factories in the case of another country. The result was that the whole thing was controlled by a very few individuals and they did not utilize the inventive ability of that particular country.

We need to get away from the conventional, old types of airplanes that we have been using during the war, to which we have been confined, and to make new types, and we want to get the greatest number of minds possible working on that proposition. Things along this line have been coming so fast since the war closed that it is almost impossible to keep up with them. I mentioned the Turpo Booster as an instance. It carries the airplanes into altitudes which were never thought of before. There are many other wonderful, unthought-of developments coming along very rapidly, and we must be prepared able to develop these things. If we confine our air activities to one of the older departments, they will be regarded as simply auxiliary and not as the main proposition.

If the Air Service is to be regarded as a major arm and developed, then, I say, combine its activities and fix the responsibility on one department for its efficiency; if it is to be considered as nothing but an auxiliary, then do not have any Air Service, which will be an announcement to the world that we will abandon the air to others' dominance, commercially and in a military way.

(Thereupon the subcommittee adjourned, to meet Monday, December 8, 1919, at 10 o'clock a. m.)

UNITED AIR SERVICE.

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Monday, December 8, 1919.

The subcommittee this day met, Hon. Fiorello H. LaGuardia, presiding.

Present, Representatives LaGuardia, Hull, Fuller, and Olney.

Mr. LAGUARDIA. We will hear first this morning Col. Milling.

STATEMENT OF COL. T. D. MILLING, AIR SERVICE.

Mr. LAGUARDIA. What is your name?

Col. MILLING. T. D. Milling.

Mr. LAGUARDIA. And your rank?

Col. MILLING. Colonel, Air Service.

Mr. LAGUARDIA. What is your position?

Col. MILLING. I am assistant to Gen. Mitchell, Chief of the Training and Operations Group.

Mr. LAGUARDIA. How long have you been in the Army?

Col. MILLING. I have been in the commissioned service of the Army 10 years.

Mr. LAGUARDIA. How long have you been in aviation?

Col. MILLING. I have been in aviation eight years and nine months.

Mr. LAGUARDIA. You were one of the first of the military aviators we had?

Col. MILLING. Yes, sir; I was the first.

Mr. LAGUARDIA. You served overseas?

Col. MILLING. Yes, sir.

Mr. LAGUARDIA. You were the first officer in charge of training overseas, were you not?

Col. MILLING. I was.

Mr. LAGUARDIA. You instituted and organized our training system in Europe?

Col. MILLING. Yes, sir.

Mr. LAGUARDIA. After that, what was your assignment?

Col. MILLING. I was assigned to the training section of the General Staff at general headquarters, and was then in command of the units in the Toul sector while that was a quiet sector; I was then chief of staff to the commander of the air service of the First Army, and later was commander of the air service of the First Army myself during the battle of the Argonne.

Mr. LAGUARDIA. You did flying yourself?

Col. MILLING. Yes, sir.

Mr. LaGuardia. You are a flier?

Col. Milling. Yes, sir.

Mr. LaGuardia. When did you return to the United States?

Col. Milling. I returned to the United States about the 1st of March.

Mr. LaGuardia. Since then you have been assigned to your present duties?

Col. Milling. Yes, sir.

Mr. LaGuardia. Colonel, the desire of the committee is to get information on the question of training, and to learn just how training can be advanced, how economy can be exercised by a united service. We want to get your views on that.

Col. Milling. In order to make that clearer I will review briefly the training that has taken place since aviation started. Aviation really began; that is, it was officially recognized in the Army about 1908, but nothing was done toward the establishment of a school until 1911, when Col. Arnold, Col. Chandler, and myself established a school at College Park. That only consisted of five or six officers and three or four machines, and we personally instructed all the officers who were brought in.

Mr. Hull. Where is College Park?

Col. Milling. College Park is outside of Washington, about 10 miles, on the Baltimore & Ohio Railroad. It is now the Post Office Department's field.

Mr. Hull. Is it about 10 miles from here?

Col. Milling. Yes; on the Baltimore & Ohio Railroad.

Mr. Hull. Toward Baltimore?

Col. Milling. Toward Baltimore; yes, sir. We used this field in the summer of 1911, and during the winter of 1911–12 we moved to Augusta, Ga., and then returned to College Park again in the summer of 1912. It was used during that summer, and we again returned to Augusta, Ga., and remained there until January, 1913, when we went to Texas City, in view of the situation then existing in connection with Mexico.

We attempted to carry on training of pilots at Texas City, and also to do some work with the troops. We remained there until the spring of 1913, when we went to San Diego and established the school on North Island, which remained in operation until just a few weeks ago. That school is not now operating. During all this time no definite plans were laid, no definite policy outlined as to the system of training that should be applied, except that which we laid out ourselves. In other words, the War Department did not interest themselves in it to the same extent that they did in the training of other troops. As a consequence the training was always haphazard, although we considered it thorough.

During this period of time there were a large number of accidents which were due primarily to the fact that it was at the beginning of the work and the machines were very poor and very hard to handle.

The school, which was established in 1913 at San Diego, remained as the only training school we had until the national defense act was passed. We were permitted by that law to make use of the civilian schools for the purpose of training reserve military aviators

who would be returned to civilian life after the completion of the training. So, we immediately made provision to take care of this method of training, and in addition instituted three or four schools of our own, at Memphis, Tenn., Miami, Fla., and at San Diego. At the same time we made use of the field of the Curtiss Co. for this purpose.

So, by the time war was declared, or shortly after war was declared, we had instructed about 220 civilians who were to be inducted into the reserve corps. During this whole period of time there was very little liaison with the Navy with regard to instruction, and there was very little money that was available for instruction purposes. Considering that fact, and considering also the fact that practically all of this training was what might be considered primary training, we could have done a good deal more and could have established better schools if those funds had been combined and the overhead could have been cut down so that we could have instructed all of the Government pilots at the same school.

Mr. HULL. You speak of the Navy. The Navy had no aviation at that time, did it?

Col. MILLING. They had a school in Florida, at Jacksonville, I think.

Mr. HULL. When was that established?

Col. MILLING. That was established about 1913, approximately. Before that, their school was at Annapolis. They had been running a school at Annapolis. They started at about the same time we did.

Mr. HULL. They did?

Col. MILLING. Yes, sir.

Mr. HULL. I did not know they attempted anything in aviation in the Navy until about 1912. They never knew what it was to fly an airplane off a battleship?

Col. MILLING. They were using these flying boats and hydros. They only had two or three machines at Annapolis which were used for that purpose. They were really not working on anything except on primary training. That is why I say this work should have been combined.

Mr. HULL. The hydroplane which would fly off a battleship was a later development?

Col. MILLING. They did not attempt to work from a battleship. In about 1913 or 1914 they were experimenting with an arrangement for throwing a machine off a battleship.

Mr. LAGUARDIA. You may proceed, Colonel.

Col. MILLING. After the beginning of the war, as you gentlemen all know, we went into the establishment of about 30 schools to take care of the training of the pilots for the aviation program as outlined for the war. At the time these plans were being formulated I went abroad. They had already made preparations for and had established one central school at Issouden, and in addition to that, had made arrangements with the foreign Governments to train a certain number of our men. From the standpoint of primary training, it was easier to train them here, except for taking care of the number of men that the foreign schools could actually handle, and we had decided to use our schools in Europe more for the purpose of revision and selection; in other words, to take the pilots who had completed

the training here and put them through the advanced course in France. After we became established, this rule was followed.

The only difficulty we found, so far as the schools themselves were concerned, was that there were not enough; the results obtained were very good. We established additional schools for specialized courses, such as gunnery and observation. The pilots and observers we turned out were as good as any on the front.

We did not feel any serious shortage of flying personnel until we actually began to operate in the St. Mihiel battle and the Meuse-Argonne battle. This was not felt at the beginning of the battle of the St. Mihiel salient, but during the last part of the Argonne attack we were so low in the matter of pilot personnel that some of the observation squadrons in my command in the First Army were as low as two or three teams in a squadron, when the squadrons should have had about 18 teams each.

At this time there were a large number of pilots and observers in this country that should have been available in France.

Except for specialized training, I consider that practically all training can be done regardless of the branch of the service the pilots are later to be used for in central schools, and thus do away with the overhead and the other additional expense that will be necessary in running a large number of schools.

Should such a method be used the pilots could be put in a school, taking, for instance, piloting training, the basic principles of observation, gunnery, and photography, and the various features necessary for any pilot to know, regardless of what branch he is working with. Then upon completion of the training under such conditions he could, if he were selected for naval use or for use in the Army, be sent to a special school for that purpose, and that is the only place where a school division is necessary.

That question has also come up in regard to the matter of training observers—as to whether or not they should belong to the Army or to the Navy; that is, with the arm with which they are working or whether they should belong to the Air Service. This question has been asked not only in our own service, but in the foreign services also, and the stand has invariably been taken by the Air Service that they should be Air Service officers and by the line, that they should belong to the Infantry or Artillery, depending upon which branch they are working with. We have tried both methods, and the result has invariably been that we get better results if they belong to the Air Service and not to the branch from which they come. Of course we have to have a course in the particular branch of the work in order that they may become familiar with the basic principles, and it would be better if they could be trained officers from those services.

But the point I brought out in regard to piloting training also holds true in connection with observers. You could put them through central schools until you wished to give them some particular special training in the type of observation you want them to do.

Mr. HULL. You speak of trying both. You surely must be mistaken on that. We have had no separate air service in this country.

Col. MILLING. I was speaking purely of observers and the question of training observers. But we had men who belonged to the air service and men who belonged to the Artillery and Infantry who

were attached to the air service who were not subject to promotion in it but were subject to promotion only in the Artillery and Infantry, and invariably the men we had in the Air Service, trained in the Air Service, were better observers, and the result showed that they would be better in that way simply by detaching them from the line of the Army itself and putting them into the Air Service.

Mr. HULL. You speak of the pilots in France. There was a lack of pilots in France, you say?

Col. MILLING. There was a lack of pilots during the latter part of the Argonne offensive.

Mr. HULL. We have always heard that there were more pilots than machines.

Col. MILLING. They were not trained pilots at that time. At the beginning, when the schools were overcrowded—and that was due to the fact that we had been misinformed as to the facilities available in England and France and Italy for the training of cadets—the big surplus of men were these cadets awaiting training.

Mr. HULL. But they were commissioned as first lieutenants?

Col. MILLING. But they had not completed their training and were not fit to fly over the front.

Mr. HULL. Whose fault was that?

Col. MILLING. I think it was due principally to a lack of coordination between the forces in France and the people here.

Mr. HULL. I know of men who were over there at the very start why stayed there all the while, and they were instructors in training.

Col. MILLING. Yes, sir; they were all being used.

Mr. HULL. And yet they never got a chance on the line.

Col. MILLING. You could not disrupt your schools. Both organizations had to be taken care of, and that shortage would have been taken care of, in fact we had men under orders here, and it would have been taken care of in a short period of time.

Mr. HULL. Did you have American planes over there?

Col. MILLING. The bulk of our planes were French planes. The only American planes we had were DH. 4's.

Mr. HULL. What did you use those for?

Col. MILLING. We used those for corps observation and for bombardment.

Mr. HULL. Is that a good plane for combat purposes?

Col. MILLING. No; it is not. The principal use for those planes would be for corps observation, where they are working at low altitudes.

Mr. HULL. Did you have any American combat planes over there at all?

Col. MILLING. No, sir.

Mr. HULL. None whatever?

Col. MILLING. None at all.

Mr. HULL. Are there any here now?

Col. MILLING. None except those that are being experimented with at our experimental plant at Dayton, Ohio; that is, American planes. You were speaking of American combat planes?

Mr. HULL. Yes.

Col. MILLING. Yes, sir; those were the only ones.

Mr. HULL. How many were there?

Col. MILLING. There are about four ordnance and four Thomas Morse, three or four of each, simply bought for that purpose.

Mr. HULL. Those are the only combat planes we have?

Col. MILLING. American-made combat planes.

Mr. HULL. That is all we have?

Col. MILLING. So far as I know; yes, sir.

Mr. LAGUARDIA. Col. Milling, when you first got overseas and established your training system, the first pilots that were ready for the front were those who received their preliminary training overseas.

Col. MILLING. That is correct.

Mr. LAGUARDIA. Do you know when they had their preliminary training as pilots in this country?

Col. MILLING. I should say it was about the first part of 1918, although I am not sure about that date.

Mr. LAGUARDIA. We also encountered difficulty in regard to the system of training owing to a lack of proper coordination and cooperation?

Col. MILLING. Yes.

Mr. LAGUARDIA. In fact, we lost very heavily at Issoud, in contradistinction to the losses among the boys trained by the French and the other people on the other side.

Col. MILLING. Yes; that is true.

Mr. LAGUARDIA. In a proper training system, under a united service, you could also take care of the training of civilian pilots?

Col. MILLING. Very easily.

Mr. LAGUARDIA. Without any additional expense?

Col. MILLING. Practically none.

Mr. LAGUARDIA. Except the wear and tear on the machines?

Col. MILLING. Except the wear and tear on the machines; yes, sir.

Mr. LAGUARDIA. That could be arranged by training these boys in return for acceptance of service in the reserve?

Col. MILLING. Yes, sir.

Mr. LAGUARDIA. Or any arrangement which might be made?

Col. MILLING. You could take care of the new applicants for the reserve corps under this training system and you could supervise the training at these centers which you would establish, and you could retain the services of the men who have already been trained; in other words, keep them in shape, which has never been taken care of yet.

Mr. LAGUARDIA. Is it not true that the most essential part of the flyer's training is constant flying?

Col. MILLING. Absolutely.

Mr. LAGUARDIA. No matter how adaptable one may be to flying, he is bound to get rusty or out of trim by lack of flying?

Col. MILLING. Yes; that is essential.

Mr. LAGUARDIA. So that if we had an extensive postal flying service, a coast guard service, and a Coast and Geodetic Survey service we could assign men to that kind of work, or even if they were only civilian flyers, the fact that we had a good many men of that kind would give us a very powerful potential air service.

Col. MILLING. Very much so.

Mr. LaGuardia. It is easier for a man who has had a lot of time in the air to acquire the advanced art of flying necessary for military fighting than for one who had just received primary training?

Col. Milling. Absolutely. If a man has had a great deal of experience simply in flying a primary training machine like the JN, if he has been in the air a great length of time, he would practically have no trouble, by himself, without further training, in stepping into the higher type of machine.

Mr. LaGuardia. The greatest trouble we encountered in the war was that all our boys had not received sufficient time in the air, was it not?

Col. Milling. They lacked experience, principally.

Mr. LaGuardia. That was something we could not overcome; it was a matter of time?

Col. Milling. It was a matter of time.

Mr. LaGuardia. Have you given any thought to the possibility and usefulness of having a national school for the development of aeronautical engineers and also the art of flying?

Col. Milling. Yes. If we had that sort of an academy, it would take care of the higher functions of the air service, such as command, and also the further study from an engineering standpoint.

Mr. LaGuardia. That would be extremely useful.

Col. Milling. It would be practically essential, you might say.

Mr. LaGuardia. That would take care of the various things of that sort that come in flying, whether military or civil?

Col. Milling. Yes, that would take care of both.

Mr. LaGuardia. Col. Milling, have you with you any figures which will show what was spent on training during the war, what is now spent on training by the Army and the Navy, and also what the proposed appropriations for the year 1920-21 would cover in the matter of training, in both the services?

Col. Milling. No, I have not those figures.

Mr. Hull. How long do you estimate it takes to make a flyer?

Col. Milling. You mean for service over the front in time of war?

Mr. Hull. Yes.

Col. Milling. If you have a thorough, businesslike organization, such as a centralized system would give us, it would take about eight or ten months. Under present conditions, as it has been going on, it would take about a year.

Mr. Hull. Major, how long did you take?

Mr. LaGuardia. I started to fly in October, 1917, and I went over the first time in August of 1918. We could turn out boys in bombing with three months of preliminary training and about one month of advanced training; that is for bombing.

Col. Milling. They would be flying advanced types; you had a different system.

Mr. LaGuardia. That was only for bombing.

Col. Milling. That would not include the specialized work. Where you have only a few men you can give them individual instruction and pay particular attention to each individual man and you could probably get them in shape very much sooner than otherwise.

Mr. LaGuardia. What is the shortest time we got boys to the front in pursuit work?

Col. Milling. From the time they started in the work here in the ground school it took them about nine months or longer.

Mr. LaGuardia. How long would it take to turn out a flier who could successfully carry on his duties as a postal flier over an easy route?

Col. Milling. I should say you could do that easily in about three months.

Mr. Hull. You advocate a school for fliers, an academy?

Col. Milling. Yes.

Mr. Hull. Do you mean to have it as a separate institution such as West Point, or do you mean to have it in connection with some other institution, such as the big universities?

Col. Milling. No, it would be a national institution like West Point; it would be an air academy, for the Air Service.

Mr. Hull. Why could you not connect that up with some universities that exist at the present time, such as the University of Illinois at Champaign, which has a very well defined, high grade aeronautical course at the present time?

Col. Milling. The bulk of the work at such an academy would not be aeronautical engineering. It would be training of the personnel in the higher forms of command of the Air Service, and functions of that sort.

Mr. Hull. Why could that not be connected up with a university having such a course as the one I have just mentioned?

Col. Milling. It is too important. I do not think it could be handled properly there. I think it should be run directly from Washington, from the headquarters here, just as the service school at Leavenworth or the War College here. It is a tactical proposition entirely.

Mr. LaGuardia. Thank you, Colonel.

STATEMENT OF LIEUT. COL. WILLIAM C. SHERMAN, AIR SERVICE.

Mr. LaGuardia. What is your name?

Col. Sherman. William C. Sherman; lieutenant colonel, Air Service.

Mr. LaGuardia. What is your present assignment?

Col. Sherman. Chief of Air Service Training.

Mr. LaGuardia. You are in charge of training now?

Col. Sherman. Yes.

Mr. LaGuardia. How long have you been in the Army?

Col. Sherman. Nine years of commissioned service.

Mr. LaGuardia. You have been attached to the Air Service off and on for how long?

Col. Sherman. I was first attached to it in 1912, and then again in 1918. I have remained with the Air Service since 1918.

Mr. LaGuardia. You are now with the Air Service?

Col. Sherman. Yes, sir.

Mr. LaGuardia. Colonel, we want to hear your statement as to the tactical future of the air.

Col. Sherman. I think the rôle of the Air Service in war is not very generally understood by most army officers. In the beginning

the work of the Air Service was confined entirely to observation. The airplane was little more than an elevated platform from which an infantryman observed for his branch of the service. As the war went on pursuit aviation was begun, and also bombardment aviation, and with the advent of these two forms of aviation the rôle of the Air Service as a whole underwent a considerable change.

In the beginning observation aviation constituted about 100 per cent of aviation. At the end of the war it hardly exceeded 25 per cent. This was a change in its rôle, and this change was not appreciated, I believe, by most Army officers. Their experience was confined almost entirely to observation aviation. The result has been that when most of the Army officers speak of aviation they mean observation aviation, and statements that are made about the Air Service are frequently correct, if we would substitute the word "observation" for "air service."

I believe that in the future this tendency toward the importance in numbers, at least, of the Air Service—and by the air force I mean pursuit, bombardment, and attack as compared with observation—will increase.

The work of observation is almost entirely a matter of skill. One very skillful man can cover, say, the front of an army and do the work just as effectively as a larger number, whereas pursuit and bombardment, other things being equal, will be effective directly in proportion to their strength. In consequence, in so far as numbers are concerned, pursuit and bombardment will increase in importance, whereas observation will not greatly increase in numbers, but our efforts will be directed to making the observers more skillful.

I want to say now that I do not think the wars of the future are ever going to be determined entirely in the air. No nation can ever be said to be defeated until its infantry has been defeated. In consequence of this, you can say in a broad way that all branches of the service and every part of the national force is auxiliary to the Infantry.

The Air Service may be classed as auxiliary, and so may the Navy. But to say that a branch of the national force is auxiliary to the Infantry does not mean at all that it is nonessential. For example, during the World War, it was absolutely essential that the Navy be used for defense in order that the Infantry could get into action. In the Manchurian campaign if the Japanese had ever lost control of the sea they would not have been able to have carried the war through to a successful issue. In fact, it is an axiom that one must have control of the sea in order to wage a successful war overseas.

The analogy between the Navy and the Air Service, I think, is very close. Both of them may definitely determine the success or the failure of the Infantry. But their work will not be done in such close liaison with the Infantry as to make it desirable that the Infantry normally shall exercise any influence over them. I have here a small diagram, which is confidential, which shows the area of excessive destruction. You may say that this large area is the area of the future war. This small area is the area in which the mobile Artillery can give effective support to the Infantry. You will see that that is the area in which pieces like the 155 guns and

guns of the lower caliber can fire effectively. The remaining area must be covered by the Air Service.

These larger caliber guns were used in the World War and can be used again, if we ever should reach a stabilized condition of warfare. But in mobile warfare, which is the normal form, and which we may expect in future wars, these larger pieces could not be used, and all that area would have to be covered by the Air Service, or else left untouched. In that area will be found all the organs of supply, and also the larger bodies of reserve. Those things must be attacked by our bombardment and pursuit planes in order to assist the Infantry in any way. Of course, there is also the work of the observation planes which should be done in intimate liaison with the Infantry; and in using the term "Infantry" I mean also to refer to its immediate auxiliaries, such as the Artillery and other branches of the line of the Army. Our Air Service must do all the work of destruction and do all the attacking that is done in that area, and the observation aviation, by observing the movements of the enemy and assisting the Infantry in many other ways which it can do, will considerably affect the success or the failure of the Infantry.

But before any of that work can be done we have to get control of the air. I do not think that in aerial warfare there is ever going to be any such thing as absolute control of the air. By that I mean that hostile airplanes will always be able to take the air, a few individuals, here and there. We can say we have control of the air, if our planes can go out and perform their missions comparatively unmolested, whereas those of the enemy can never perform their missions without being seriously interfered, and perhaps altogether destroyed.

So a necessary preliminary for the Air Service in doing anything whatsoever in the aid of the war is to gain control of the air, and that is a matter that is entirely aerial in its aspect. It has nothing whatsoever to do with the Infantry in point of time, and I think we can expect it to take place before the larger classes of ground troops have come in contact, and the methods that will be employed will be wholly aerial. In short, no liaison whatsoever is necessary with the Infantry, and the Infantry aspect of the situation will scarcely influence at all the tactical employment of pursuit aviation. It is a necessary preliminary to the accomplishment of the other objects of a fighting air service and the accomplishment of the work by observation aviation. So much for the land proposition.

I do not want to be radical on the subject of the work which the Air Service may do on sea. I am not a Navy man, but Lord Fisher has stated that he expects the Air Service eventually to drive the Navy entirely under the surface of the sea. With the improvement of the precision bomb and the development of the torpedo which can be launched from airplanes, and perhaps directed by wireless from airplanes, it certainly seems to me to be within the range of possibility.

But be that as it may, any water fighting with navies is bound to be in all respects similar to fighting over land. I know there exists in some quarters a belief that any air service which operates with the Navy should be able to land on the surface of the water. I think that is fallacious. That is regarding the Air Service from a strictly naval point of view rather than from an aerial point of view. No

airplanes which can land on the surface of the water can be built which can compete in fighting with the land type of airplanes. The only difference, really, that there will be between fighting over water and fighting over land will be the character of the airdrome from which the Navy airplane, so to speak, will take off from and upon which it will land. In all other respects the fighting will be exactly the same. It will be governed by aerial tactical principles; the methods of employment will be wholly aerial and will have absolutely no relationship to naval tactics. In other words, the entire matter of air fighting in war is a matter which must be governed wholly by air service principles.

If we were to adopt our present organization and assume, for example, that the Navy has an Air Service and the Army has an Air Service which are of equal strength, and under our present employment, if there were to be a naval engagement we would have assisting the air Navy only an Air Service which, we will say, is 1. If afterwards there would be land fighting we would have assisting our Army another Air Service, which we will say is 1. Whereas, if we had unification of these forces we could bring to bear in the naval battle a force which you might represent by 2, and afterwards, provided there had been no great losses in that force, we could bring to bear in the land fighting a force which we could also represent by 2. By uniting them you have double strength for each operation.

It might be said that in the event of war we could put an Air Service under a common commander and they could then be employed against any objective. I do not think that is true. You can never take two forces which are brought up under different systems of training and have never learned to cooperate, and which perhaps have totally different tactical doctrines and get them to cooperate so closely that their full strength can be considered to be gotten by adding together their separate strengths.

In short, I think the tactical principle that any Air Service must have to seek out the hostile Air Service and destroy it, and this can only be done by uniting all the air forces together and employing them according to aerial tactical principles.

Mr. OLNEY. Your conclusion then is that an airplane is most valuable for observation and is indispensable as an auxiliary in time of war, but its most valuable purpose is for observation in aid of the Infantry?

Col. SHERMAN. No, sir; I did not mean to convey that impression. That is the most important function from an Infantry point of view, for the close, direct support of the Infantry. It is the only function of the Air Service that needs to have intimate liaison with the Infantry, and considered from that point of view it is the most important directly to the Infantry of any of the functions of the Air Service. Indirectly the work that would be done in attacking the reserves of the enemy and his organs of supply would have its effect on the fighting forces, and that is more than merely having the knowledge obtained from observation.

Mr. HULL. Do you know of any country that fights its Air Service at the present time as a separate unit, and if so, what country does that?

Col. SHERMAN. Of course, at present, the three powers which have an air service of any considerable size have, in effect, combined them.

Mr. HULL. Yes; but they do not fight them as separate units: they fight them as auxiliary forces. At least, that is the statement made by Gen. Pershing.

Col. SHERMAN. Well, sir; I can say that in the latter part of the war the bombardment was done, to a certain extent, in liaison, with the Infantry, but the liaison was certainly not intimate, and the employment of the pursuit planes, which is, of course, the chief fighting airplane, was practically totally independent of the Infantry. The only influence the Infantry had on the air fighting in the latter part of the war was that it established the dividing line between the enemy's territory and ours.

Mr. HULL. I am not one of those who, simply because England or France does a certain thing, would say it was correct. However, I think we might look at the matter in a broad way, and I do not want to be understood as minimizing the importance of the Air Service. But there is one thing that occurs to me in listening to you. You say it has an analogy in the Navy?

Col. SHERMAN. Yes, sir.

Mr. HULL. The Air Service could not by any possibility, could it, fight it separate and distinct from the Army or the Navy because of this fact, that it can not establish a base of operations, can it? If it can, how can it do that?

Col. SHERMAN. It has never been done, sir.

Mr. HULL. I do not think it will be done, this side of heaven.

Col. SHERMAN. I should hesitate to say absolutely that it will, but I consider it possible.

Mr. HULL. That may be, but you want to remember that you can not establish a base of operations independent of the Army and the Navy.

Col. SHERMAN. No, sir; and when I spoke of an analogy between those two, I mean in so far as the enemy they have to meet and the air knowledge they have to meet that enemy.

Mr. HULL. But they must fight from the Navy or from the Army; is that not true?

Col. SHERMAN. That is very largely true. But I can think of a number of tactical situations in which that would not be the case, and I believe that when we speak of fighting from the Army we have learned to fight from a land base, which finally must be guarded by the Army, and it is the same in the case of the Navy. No Navy can operate without a certain number of bases scattered about the world.

Mr. HULL. But the Navy can sustain itself for a great length of time, and the Air Service can not; is that not true? How long can an airhip stay in the air?

Col. SHERMAN. Unquestionably the Navy can sustain itself for a longer time than the Air Service, but both of them are essentially non-self-sustaining, in so far as operations are concerned. No Navy could sustain itself—I am not enough of an expert along that line to say just how long.

Mr. HULL. How long do you imagine?

Col. SHERMAN. I think we might use the illustration of the Russian fleet as an example. When Admiral Rojestbensky attempted to get

the Russian fleet from the Baltic Sea, and had got to the Tsuschima Straits, it took them about six weeks, due to the fact that they were not able to put into a base for repairs, so that they met the Japanese fleet in such shape that they were very easily destroyed. That was due very largely to the fact that they were away from their base for so long.

Mr. HULL. But the Navy has bases all over the world?

Col. SHERMAN. Which, however, have to be defended by land troops from any land attack.

Mr. HULL. They are defended by the Navy personnel; as a matter of fact, a great many of those bases have no infantry at all.

Col. SHERMAN. Where you have a base on an island you have to control the sea.

Mr. HULL. That is one reason we have the marines, and they are in control of the Navy. I just wanted to know your idea would be about that when you advocate an entirely separate Air Service. I can not see how the Air Service would sustain itself because it would have no base of operations.

Col. SHERMAN. Of course nobody would advocate sending only an air service to conquer a country. You send everything you have.

Mr. HULL. If you sent only the Air Service, alone, it would not last very long.

Col. SHERMAN. No; that is true.

Mr. HULL. I think that is one thing that must be remembered.

Mr. FULLER. I think so far as the matter of a separate service is concerned, that is, separating the Infantry from Aviation. Gen. Pershing's thought was that it was a branch of the service like the Artillery.

Col. SHERMAN. I think it is essentially different from the Artillery. Take the rôle of the Artillery in war. A part of the Artillery that does effective work is right up with the Infantry and very frequently is controlled directly by the Infantry commander. When the Germans came over in March they had attached to each battalion of infantry a four-gun battery, and those were directly under the orders of the infantry commander. That has to be so, because the liaison between the Artillery and the Infantry has to be very close because the Artillery has to fire at certain points with reference to their own Infantry. It is quite a different proposition with the Air Service. When you are fighting a man up above, it does not matter much where the Infantry is.

Mr. FULLER. Is not that the least important part of the work up to that time?

Col. SHERMAN. No, sir; I think it is the most important part, because it is absolutely necessary before you can do the other work, and it is as important for the Navy to win a naval victory before you can do any operations overseas. If we had attempted to send troops to Europe when Germany held control of the seas, it would have been futile; and a necessary preliminary to that would have been a naval battle. The first thing in a case of that kind is to gain superiority.

Mr. FULLER. The first thing to build in an airplane program is combat planes?

Col. SHERMAN. The first thing to build is combat planes.

Mr. FULLER. Of which we did not build any?

Col. SHERMAN. No, sir.

Mr. LAGUARDIA. Let us get this matter of a base straightened out in our minds. An air service needs a base of operations, does it not?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. And it must be on the ground?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. We generally establish a base behind our own lines?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. That is protected by distance more than anything else?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. And the attack of the enemy air force is also an objective?

Col SHERMAN. Yes.

Mr. LAGUARDIA. Assuming that the Air Service of a power is destroyed entirely and the enemy secures control of the air; the bases of the land force become rather dangerous, do they not?

Col. SHERMAN. Yes, indeed.

Mr. LAGUARDIA. So that a base of one is necessarily dependent upon the other?

Col SHERMAN. To a great extent; yes, sir.

Mr. LAGUADIA. Let us take the matter of cooperation, when you say the air service would fight independently you mean, of course, always with cooperation, and under the command of the commander-in-chief of the forces?

Col. SHERMAN. Unquestionably; yes, sir.

Mr. LAGUARDIA. If an army is going to land a force in the enemy country and the navy makes the first attack to protect its landing, that is always conducted under a common command, or commander in chief?

Col. SHERMAN. Absolutely.

Mr. LAGUARDIA. Just as in the case of the landing of our forces in Cuba, the Navy did not work entirely independent of the Army; there was constant cooperation and counsel?

Col. SHERMAN. Always; yes, sir.

Mr. LAGUARDIA. So that in the case of this third power or element which has come into being, there would be consultation and cooperation with the commander in chief of the forces of the army and navy and the air?

Col. SHERMAN. Absolutely; yes, sir.

Mr. LAGUARDIA. So that the air force would not go off on a mission independently, by itself, at all, but it would be engaged in a useful purpose, to carry on a plan of attack?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. You have made it clear to me, I think, but in order that it may be clear on the record, the reason you said observation is not the most important function of the air is this, that in the beginning of the use of an Air Service, observation was the only function because there were no means of attack; we could cross each other's lines very compacently and take photographs unmolested?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. Since the development of fighting in the air, while observation is always a necessary essential, it must be protected?

Col. SHERMAN. It must be protected.

Mr. LAGUARDIA. Therefore to carry on your observation work properly it is necessary to create and maintain a fighting force in the air which will give time, opportunity, and space to carry on the observation work?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. That being so necessary, that is the reason why the first fight of a war to-day would naturally take place in the air, so as to clear the air, just as a naval fight would be necessary to clear the water for the transportation of our troops, or for the invasion of a country?

Col. SHERMAN. Absolutely; that is correct.

Mr. LAGUARDIA. So when you advocate a united service you mean, of course, that it would be independent in the matter of production and supplies and maintenance; it would fight in the air by itself, but it would always be conducted naturally in cooperation with the rest of the forces.

Col. SHERMAN. Absolutely; it has to have cooperation with all the national forces.

Mr. LAGUARDIA. You made reference, I think, to a floating airdrome. That has passed the experimental stage?

Col. SHERMAN. My understanding is from the reports that it is an accomplished fact with the British.

Mr. LAGUARDIA. In the matter of bombardment, is the plan which you refer to in your testimony confidential?

Col. SHERMAN. Yes, sir.

Mr. LAGUARDIA. In order to make that point clear, is it not true that the more guns there are or the longer their range, at the time war is declared, it would mean that the bases and other necessary points are always maintained beyond that range?

Col. SHERMAN. Yes.

Mr. LAGUARDIA. So that in order to reach them, we have to reach them from the air, regardless of what anybody may say about it?

Col. SHERMAN. Yes, sir. And I may state in that connection that during the last war we had a very strong artillery force with very long range guns brought into action, but that was a very special conditon; but in no normal war could any one begin to employ either the amount of artillery or artillery of as great range as was habitually employed in the World War. The question of supply is so difficult, that as a practical proposition artillery which is going to be effective has to be restricted to the 155, or guns of lower caliber, and that means that perhaps 10 kilometers is about the limit at which you can do effective artillery firing, and everything behind that must be covered by airplanes.

Mr. LAGUARDIA. Therefore the side which has control of the air and a sufficiently powerful air force can put out every night, and every day, if necessary, a sufficient number of bombing planes to remove those bases beyond a practical distance?

Col. SHERMAN. Absolutely; it can completely disrupt the service of supply.

Mr. LAGUARDIA. Which is the most essential part of modern warfare.

Col. SHERMAN. When that is done an army has to quit. That is why the Germans quit in the Argonne-Meuse. We got their railroad, and had we had enough airplanes to break it up in the first place they would have had to quit earlier.

Mr. HULL. Have you read the different bills now pending before Congress on this subject?

Col. SHERMAN. I have read Senator New's bill and Mr. Curry's bill, and I think I know what is in your bill.

Mr. HULL. I think Senator New's bill contemplates the appointment of a separate cabinet officer at the head of the Air Service, but Mr. Curry's bill does not do that.

Col. SHERMAN. Yes, sir.

Mr. HULL. Do you believe it would be possible at the present time to have a Cabinet officer at the head of this united service?

Mr. LAGUARDIA. I may say, Mr. Hull, that I asked Col. Sherman to come before the committee to testify in connection with the tactical side of this proposition.

Col. SHERMAN. I do not believe I am competent to answer that question.

Mr. HULL. But the officers who appear before the subcommittee on this subject are supposed to know something about the legislation.

Mr. LAGUARDIA. I have arranged the witnesses so that each man will testify on the one subject on which he is an expert. Of course, I do not object to any question of that kind, but I wanted to explain to you why I asked Col. Sherman to appear before the committee.

Mr. HULL. You speak of the analogy to the Navy. Have you ever thought of the analogy of the Air Service to the Cavalry?

Col. SHERMAN. A great deal; yes.

Mr. HULL. Is it not true that it comes nearer—I will admit that it is not quite analogous—but does it not come nearer to the Cavalry than to the Navy?

Col. SHERMAN. In its relationship to the Army?

Mr. HULL. Yes.

Col. SHERMAN. No, sir; I think not. The cooperation between the Cavalry and Infantry and Artillery must be so intimate that necessarily they must be constantly brought together and constantly employed together.

Mr. HULL. I will admit that there is no analogy to the Air Service, as a matter of fact. It is absolutely something new.

Col. SHERMAN. It is a new element.

Mr. HULL. It is a new element, and we have to recognize the fact that it is something to which there is no analogy.

Col. SHERMAN. No absolute analogy.

Mr. LAGUARDIA. Thank you, Colonel.

STATEMENT OF LIEUT. COL. LESLIE McDILL, AIR SERVICE.

Mr. LAGUARDIA. What is your name and rank?

Col. McDILL. Leslie McDill, lieutenant colonel, Air Service.

Mr. LAGUARDIA. What are your present duties?

Col. McDILL. I am assistant to the Chief of the Operations Division of the Air Service.

Mr. LaGUARDIA. How long have you been in the service?

Col. McDILL. I have been in the service five years and three months.

Mr. LaGUARDIA. In the Air Service?

Col. McDILL. In the Air Service. I have been in the Army seven years.

Mr. LaGUARDIA. You saw service overseas?

Col. McDILL. I had about one year in training. I have served a year and a half, because of my connection with the Coast Defense, with the Coast Defense squadron which was sent to the Philippine Islands. From there I went overseas and served in connection with the establishment of the aviation schools in France, and after my completion of pursuit training I established the aeral gunnery school in France. I returned to the United States in February, 1919, and was put in charge of the coast-defense section of the Operations Divisions.

Mr. LaGUARDIA. You are now in charge of the coast-defense work?

Col. McDILL. It has been consolidated, and I am still in charge of it.

Mr. LaGUARDIA. Will you give us your views as to the general utility of aviation for coast defense, and how a united service would increase the efficiency of such service?

Col. McDILL. I think, before I take up the necessity of a united service I had better first give you a brief outline of the functions of aviation used in connection with coast defense, and I will differentiate as to those functions in time of war and in time of peace. I will also differentiate them into three divisions, according to those which are spe ifically Army, those which are specifically Navy, and those in which duplication arises.

Taking up the functions which are specifically Army functions, the first one would be that of reconnaissance. I think it would be perhaps best to imagine a port of the United States at which there were established a naval base and an Army Coast Artillery contingent, and imagine an attacking fleet with airplane carriers and an attacking air force.

As this fleet approaches it would be first necessary to determine at which one of the ports along the United States coast it would probably strike. For this it would be necessary to know the reconnaissance distance. Due to the fact that the air force can travel at so much greater speed than any possible scout cruisers of the Navy, and due to the great visibility—which on clear days has been over 100 miles at 5,000 feet—it would be very possible to locate an approaching fleet at a considerable distance out, from 200 to 300 miles. Having located the fleet and determined its probable strength and its probable mission, this information would be immediately communicated to the commander of the forces back at the different ports. That would be given to the commanders of both the Army and Navy forces, because they would be interested in this data.

The air force having established contact—I will take up only the reconnaissance planes, those which have nothing to do with the at-

tack—those planes would continue their work and make frequent reports, reporting any change in disposition, which is absolutely essential to prepare enough force to repel the attack and to give them time to prepare for action, and to enable the Coast Artillery to prepare for action. It is almost impossible for the Coast Artillery to prepare for action immediately, because in order to get the best results with the present guns it is necessary to blend the powder. That takes from five to six hours, and it does not function so thoroughly if prepared for a long time beforehand. So this advance information is of the greatest value in connection with the accuracy of the coast artillery fire.

When the approaching fleet comes within attacking distance, aviation then assumes the function of fire control and fire adjustment. Our present seacoast artillery is not equipped for very long range firing, but it is rapidly being equipped, so that practically we can speak of the seacoast artillery as being equipped with a gun which will fire 20,000 yards, and they are making modifications which will bring the range up to 40,000 yards. It is absolutely impossible from the coast defense stations to properly direct this fire from fire control stations on the ground. There are three features which would interfere with that. One feature is the question of visibility; the second feature is the question of the curvature of the earth—it is beyond the range of the low-position station; and the third feature is the fact that the opposing fleet would probably bring up a smoke screen and absolutely hide the fleet behind a cloud of smoke, where it could not be seen from the opposing battery.

For this purpose there would come in the adjustment of fire at those long ranges. We have made actual experiments at three stations, and it has been remarkably successful—that is, the direction of fire. The guns are put on the target by means of radio control. It has been remarkably successful, and it is almost impossible to use the present long-range equipment without the use of aviation.

The coast defense also provides for balloons for this purpose, and they would be very valuable; and it is also necessary that they have heavier-than-air machines, because of the visibility in cloudy weather, and the use of the smoke screens, which sometimes makes it impossible for balloons to operate, although they are much better than air-control stations on the ground. Aside from the feature of reconnoissance and adjustment, the functions of coast-defense aviation will also include the protection of the vital points of the fort from the attacks of hostile airplanes. The fire-control stations at the coast-defense stations are very vulnerable to attacks from the airplanes. Also, the ammunition dumps and the supply dumps are vulnerable to attacks from enemy aviation, and an attack on them would seriously interfere with the operations of both land and sea forces should hostile aviation attack them.

So it is necessary to be able to combine all the air service of the country, both the Army and Navy, and unite the air forces at the points being attacked; and unless the forces are so united and under an executive system which will enable them to be concentrated rapidly at the point to be attacked, it would be almost impossible to prevent a hostile fleet from doing great damage to the coast forts.

In addition to providing a defense against hostile aviation, the coast defense air force, or the united air force assigned to coast-

defense work, can do considerable damage to an attacking fleet. I think Col. Sherman outlined that feature, so I will not repeat that phase of it. Supposing the attacking fleet has been unable to establish a base, the defending air force would be able, practically, to conduct operations against any base and prevent landing parties from being successful by the use of machine-gun fire and bombs. In case a landing force did get on shore and establish ammunition dumps, the air force could operate and blow up the ammunition dumps and the storage dumps.

The Navy desires an air force for a similar purpose of reconnoissance and fire adjustment of the battleships, and its adjustment and reconnoissance is practically the same as that needed for an Army air force, and the functions of an air force assigned to the Navy are not only the same, but could be controlled by the same personnel, with slight differences in their training. It would be necessary, however, in order to be able to use this personnel for both the Army and Navy, to give it a course of training with both. A united air force would then be able to change the assignment to one or the other, according as it was needed.

The peace-time functions of this united air force show a great deal of duplication in the work which is being proposed for the Army coast-defense air force and for the Navy coast-defense air force, and both are equally able to do this work, and it could be much better handled under one force.

By these auxiliary operations, I mean the patrol of harbor mine fields. It is absolutely essential, in order to locate any possible enemy mines, to have air observation of these fields; and if our observers know the location of the mines and know the actual position of the mines, it can be much more simply done than if it is done by surface craft.

The attacks against submarines can be undertaken with bombs by both the Army and Navy air force, and the enemy mines and submarines can be put out of commission by either.

Other functions of a united air force, perhaps, in time of peace are those in connection with the Coast and Geodetic Survey, in assisting them in preparing maps. It has been found that topographic coast defense charts can be prepared much better and much cheaper by means of aviation, taking the photographs from airplanes, than by any other method, and the Coast and Geodetic Survey are asking for this work on a large scale.

Then, too, great assistance can be given to the Weather Bureau in examining and reporting upon upper air conditions.

Assistance can also be given by the use of forest patrols, and these Air Service patrols can give assistance also to service craft in distress and report on them, and locate them in case they do not happen to have wireless. The Air Service can also be of great assistance in the seal fisheries patrol and in locating obstructions to navigation.

All these functions are functions of a united Air Service, and if the coast defense operations are not placed under a united Air Service there will be great duplication in that work of aviation which would otherwise be assigned to the Army and to the Navy separately.

Then, too, in connection with the Panama Canal, it is absolutely essential that we have a large air force there to protect the canal

against enemy aviation operations, and there are similar needs for similar protection in Hawaii and the Philippines, because they are similarly vulnerable points.

I would like to take up the question of coast defense by lighter-than-air machines. The same dirigible that is used by the Navy in overseas control can be equally well used by the Army in overland control, and the assignment of dirigibles to a united force would mean that fewer dirigibles would be necessary to do the work if they were properly mobilized.

In the matter of coast defense, it would give a considerably better force and would provide this protection at a given point. The coast defense project would involve the establishment of stations or airdromes at practically all the important points along the coast, but it would not involve the establishment of the complement of an air force at each of the stations because of the fact that the air force can be mobilized very quickly. If these airdromes are established the air force can be mobilized wherever needed along the coast within a very few hours.

If the Army and the Navy are allowed to proceed as at present with their individual plans we will have probably 50 per cent more stations than necessary. The Army plan involves stations at Portland, Boston, Newport, New Haven, New York, Delaware Bay, the entrance to the Chesapeake Bay, Charleston, Pensacola, New Orleans, San Diego, Los Angeles, San Francisco, the Columbia River, and Puget Sound, with perhaps two or three other stations, should the funds and the force be available.

The Navy are planning to establish stations at Chatham, at the end of Cape Cod, Rockaway Beach, Cape May—that is, Delaware Bay—three along the Chesapeake Bay, one at Cape Frear, one at Paris Island, one at Key West, one at Pensacola, and one at Panama. The proposed Army stations would do the work of all those Navy stations. The Navy stations can not do the work of all the Army stations because all of them are not situated so that they could support the Coast Artillery in coast defense. The Navy work could be done by the Army stations, so there would be great duplication in the establishment of stations.

I am not going to take up the question of duplication in training because that has been discussed.

Mr. HULL. Do you advocate a separate Air Service as far as operations go?

Col. McDILL. I would not call it a separate Air Service, I would call it a united Air Service. It is a question of coordination at the top. Are you going to coordinate all the divisions of aviation under one head, and then coordinate those with the Army and Navy, or have the coordination through the Army and Navy? It is simply a question of which way you want the lines of coordination to run. I believe the different divisions of aviation could be much better coordinated by putting all of them under one head and having that one head coordinate with the Army and Navy than by trying to coordinate the aviation divisions of the Army and Navy separately.

Mr. HULL. As I understand it, you simply would coordinate the personnel of the different branches and then detail them to the different branches and have them as a part of their force?

Col. McDill. The observation units would have to be detailed in time of war and put under the command of the Army and of the Navy, and they could be a part of the united air force detailed, or they could continue that way in time of peace.

Mr. Hull. What about the combat force?

Col. McDill. The combat force to be available must be united under one command, separate from the Army and the Navy, so that it may function easily with either the Army or the Navy. That higher command would probably——

Mr. Hull. Then in a war such as this one you would have a separate command of the air force; is that right?

Col. McDill. I do not want you to be under a misapprehension.

Mr. Hull. I want to understand what you are driving at.

Col. McDill. I want to answer your question specifically, but I do not see how I can answer it specifically and give you the right impression.

Mr. Hull. We had an air force in France. Under your plan that force would not be under the command of the general of the Army.

Col. McDill. A portion of it would be assigned to his command.

Mr. Hull. That would be simply the observation portion.

Col. McDill. Observation, yes.

Mr. Hull. But the men in the combat force would be fighting as a separate unit under the command of an air general; is that your idea?

Col. McDill. They would not be operating as a separate unit under the command of an air general.

Mr. Hull. Where do you draw the line?

Col. McDill. Because there would be a commander in charge of all the operations according to the nature of the main operation, military or naval.

Mr. Hull. But he would be the general in command of the air force?

Col McDill. Gen. Pershing was put in command of all the operations in the theater of war.

Mr. Hull. He had absolute command?

Col. McDill. One man must have absolute command. It is a question of how he is going to give instructions. Is he going to give instructions through several different divisions to the air force assigned to those several divisions, or is he going to give them instructions through one air force commander controlling the air force?

Mr. Hull. Then, for instance, when Gen. Bullard was in command of the First Army he would not be in command of the air force with that army, but Gen. Pershing would?

Col. McDill. Gen. Bullard would be in command of the air force assigned to him, and the supreme commander would assign to Gen. Bullard the air force he needed under his direct command.

Mr. Fuller. Then in the instance you just cited, Gen. Pershing would not be dealing with the commander of the air force; he would be dealing with Gen. Bullard?

Col. McDill. The supreme commander in the theater of operations would have under him an air commander whom he could use, and he could use those air forces as he wanted, and he could detail from the air force certain portions of it to be asssigned to the dif-

ferent army commanders, in the same way in which a certain portion of the navy was assigned to transport duty, and those transports were under the Secretary of War. It would be very much the same as in the case of the British expedition to Gallipoli.

Mr. HULL. Do you know of any of the great countries that fight their air forces as you contemplate fighting our force?

Col. McDILL. The British, during the war organized an independent air force.

Mr. HULL. Yes; and they are having a lot of trouble with it at present. That was an independent, separate air force, and I do not think there is any controversy in regard to the matter of a separate air department. But the line of demarcation between what you are advocating and what the generals of the army—I have not heard any general in the army who will go as far as you contemplate, and I have not heard any man who will go as far as you contemplate in having a separate air force on the field of battle. What we are trying to get at is the truth. I am open to conviction, but I have not seen anything yet that convinces me that you can fight an air force in the field separate from the other forces that are there, the infantry or the artillery, under command of the commanding generals.

Col. McDILL. I am not advocating that.

Mr. HULL. You do not advocate it?

Col. McDILL. I do not advocate it.

Mr. HULL. But you do advocate having an air general?

Col. McDILL. That does not mean that he is going to fight sepa-

Mr. FULLER. He must have, from the very nature of his duties

rately from the Army.

greater latitude than a commander of artillery, for instance; is that not true?

Col. McDILL. Yes, much greater.

Mr. HULL. More than the commander of a division of cavalry?

Col. McDILL. Yes, the man in charge of all aviation must have much more.

Mr. OLNEY. Because he has something to do with every division.

Col. McDILL. I do not advocate an air force that will fight separately from the rest of the Army. A division command needs to have an air squadron assigned to it under the command of the general of the division, and the united air force would contemplate the assignment of such aviation squadron to the commander of a division; a corps commander must have a squadron of aviation assigned for work with his corps, and the united air service contemplates making that assignment; an Army commander must have a certain air force for observation assigned to him, and the united air force contemplates that.

Mr. HULL. I quite agree with you that far, and I think your idea and mine are about the same, except that in my opinion all we can do by legislation is to create a department of aeronautics and give to it all the power necessary and let them work out the proposition with the Army and Navy, but we can not legislate in regard to details.

Col. McDILL. Yes, sir; I think that is correct.

Mr. HULL. We can not tell them how they are going to run a battle, nor how they are going to coordinate on the battlefield, but if they

have the power they can take care of themselves in connection with the Army and the Navy. That is my theory of it.

Col. McDill. Yes, sir; that is the theory I was working on, that this coordination and cooperation could be worked out.

Mr. LaGuardia. In order to make clear the matter of fighting independently, is it not analogous with the Navy? The Navy will assign the Army transports and protect those transports, for that given purpose, and they are working under the command of the Army. Now, then, they have an additional duty to perform and that is the clearing of the waters, seeing that the troops land, and if a naval engagement is necessary that is something which they will conduct themselves. Is it not the same in the air? The air commander would detail the necessary squadrons to the various fronts and to the various divisions for observation and other purposes, and his duty would be to keep the air clear so that the squadrons can function, and also to protect the bases of supplies of his own force.

Col. McDill. That is correct.

Mr. LaGuardia. He would work always in cooperation with the commander in chief of the forces, he would receive information as to what the plans were so he could clear that sector in the air, but when they are in the air fighting, then, of course, they are fighting under their own command, and are not going to wait to hear from the ground as far as maneuvers in the air is concerned.

Col. McDill. Yes.

Mr. Fuller. That is inevitable, is it not?

Col. McDill. Yes.

Mr. Olney. If Mr. Hull's bill or Mr. Curry's bill is enacted, or some similar bill creating a central authority, would there be any danger of the Army or the Navy becoming subservient more or less to commercial aviation?

Col. McDill. I think not, because I think it is a question of personality. The men who are in the Navy aviation who would be assigned to it would be just as keen on the proposition. The experience of the British in connection with the air forces during all the development of the air forces in the war was that the development was on the side of aviation educating the army and the navy to the benefits that would be given to the army and the navy by aviation, instead of the reverse, the army and navy asking for aviation. In other words, it is a question of education, and if such a condition were to continue it would be equally applicable in this country; that is, the Army and Navy aviation, or the aviation for the Army and the Navy, I believe, would be a better system and would receive greater development if the people in it received greater backing in the education of the Army and the Navy to the uses they could make of aviation.

Mr. Fuller. You spoke of the desirability of operating the air forces independently, and I can see the need of it to a certain point, in order that the air forces should reach the highest point of efficiency in time of peace and execution in time of war, but I wish you would give us an illustration of why you dwell on that. In what respect would the operation of aviation under the present system suffer? I can see how in that branch of the service those men familiar with it realize its possibilities somewhat better than the old stagers, but I am wondering whether——

Col. McDILL. The object of advocating a united air force is in order to make all the units able to attack at the point where most needed, and in order to bring those units to that point most quickly.

As an example, suppose an attack on the coast was attempted. With a united air force, and by governing the plans of coast-defense protection, we would establish stations—not too many—but in proper numbers for both phases of the Army and Navy work, and those stations would be so established that the units with them could be quickly mobilized, and the great body of the air forces which was not assigned to the Army and Navy could be brought in, in addition, and concentrated at one definite point to withstand an attempted invasion. In other words, in the event of an attempted invasion or attack on New York the units from the Gulf and Pacific coast would be brought across and the units established at the airdromes in the interior would be concentrated at that one point and they could be much better concentrated if the executive machinery for concentrating them were built up.

Mr. FULLER. Surely.

Col. McDILL. It is all well to say that the people would want to coordinate, and they probably would, but you have got to have the machinery built up and ready for action to do this coordinating and to do this mobilizing at one point; otherwise you would fail.

Mr. HULL. But you would have them all under the General Staff, as far as the land forces are concerned?

Col. McDILL. Well, I have not studied the actual workings of that organization.

Mr. HULL. That is the thing, to make them steady.

Col. McDILL. What I mean is this. It is perfectly possible to go into one, two, or three and tell how best they could work, but I think it would be better worked out by the people, who were put in charge of these forces, for legislating standards.

Mr. HULL. That is the very point I want to make, that you have got to place it there and let them work out the details. I do not know of anybody that contemplates establishing an entirely new service at the present time. It may come.

Col. McDILL. You misunderstood me, I think. I mean the details of administering this united air force with the Army. As to exactly whom they would be under would be a question when the actual mobilization came, but I do not believe it can be worked out correctly unless you do establish a united force. Whether you give it a Cabinet position, or whether you make it subsidiary, it certainly must be a united force.

Mr. HULL. I think everybody is agreed on that.

Mr. FULLER. You spoke of the use of airplanes against submarines in the war. Were they used effectively against submarines during the war?

Col. McDILL. Yes, sir.

Mr. FULLER. So that they destroyed some submarines?

Col. McDILL. Yes, sir; on coast defense. I know of a station located about 12 miles from my own where they destroyed some.

Mr. FULLER. Can you give us an idea as to what extent, or would you just say effectively?

Col. McDILL. I would just say effectively, because I do not have the statistics.

Mr. FULLER. Were they used effectively in locating mines?

Col. McDILL. Yes; they were used effectively in locating mines; they can be used very effectively in that work.

Mr. FULLER. I am asking some very ignorant questions. Can you see a mine from an airplane?

Col. McDILL. You can see a mine from an airplane, and you have to camouflage your mines to prevent the enemy from seeing them.

Mr. FULLER. From what distance can you see a mine in an airplane?

Col. McDILL. Twenty, thirty, or forty feet. It depends a great deal upon the surface conditions of the water.

Mr. FULLER. How effective are antiaircraft guns, or how effective would they be in defending the Panama Canal?

Col. McDILL. It depends upon the type of gun that is developed. The success of antiaircraft guns is not wholly proved by any means. In fact, they were not any great success. They made it extremely dangerous for airplanes to come in, but they certainly did come in.

Mr. FULLER. Then the antiaircraft guns were not effective?

Col. McDILL. They would not be effective in protecting the Panama Canal, because they will take chances, and they can come in.

Mr. LAGUARDIA. It does make a pilot very uncomfortable, I can tell you that. Although you know that your chances are good and that very few are brought down by antiaircraft guns, yet when you fly through a barrage it makes you feel very uncomfortable.

Col. McDILL. Antiaircraft development did not reach a complete stage during the war. There was quite a controversy in regard to antiaircraft guns as to whether they should use a high-velocity gun, with a relatively short length of life for the tube, due to erosion, or a gun with a lower velocity with a longer life of the tube of the gun. With a higher velocity gun you can get a great deal more accuracy.

Mr. FULLER. The city of Cologne was given protection by the use of antiaircraft guns.

Mr. LAGUARDIA. London had quite a defense.

Mr. FULLER. How many airplanes would it take to adequately defend our coast line, or, rather, provide a skeleton that could be extended? You outlined a plan, and I just wondered how many airplanes it would take.

Col. McDILL. By establishing a unit of a flight each at about 16 stations, involving practically 144 airplanes along the coast, it would establish simply a nucleus at each station, and these flights would work with the Artillery, establish a system of fire control, etc., and then in the event of war they could be mobilized at any point needed. Of course, that does not take into consideration the question of the fighting function of the air forces, an attack on the Navy, and defense against enemy airplanes. For that purpose there would need to be in the country located at strategic points, from which the airplanes could be mobilized quickly at the point of attack, a very much larger force. But there would be established right at the stations about 144 along the coast of the continental United States.

Mr. FULLER. How often will these have to be renewed, in the present development of the art?

Col. McDILL. Airplanes?

Mr. FULLER. Yes.

Col. McDill. In the present development, not allowing for the replacements due to accidents—rather lumping it all into one, replacements due to accidents, and replacements due to wearing out of machines in time of peace, they would probably be renewed each year. That involves 50 per cent spare parts, though, for the rebuilding of planes during the year.

Mr. Fuller. But you would say, from the standpoint of improvement, that would be necessary, would you not?

Col. McDill. You mean improvement in type?

Mr. Fuller. Yes.

Col. McDill. Well, probably. I would hesitate to speak on the subject, because it is only a personal opinion now, and it is not due to absolutely thorough study in detail; but probably once a year.

Mr. Fuller. Those built for the war are out of date already, are they not?

Col. McDill. There are advanced types of machines which absolutely supersede them, and in the hands of a hostile power the present types would not be able to function.

(Whereupon, at 12 o'clock m. a recess was taken until 3 o'clock p. m.).

AFTER RECESS.

The subcommittee reassembled at 3 o'clock p. m., pursuant to the taking of recess.

STATEMENT OF COL. THURMAN H. BANE, CHIEF ENGINEERING DIVISION, McCOOK FIELD, DAYTON, OHIO.

Mr. LaGuardia. Give us your full name, Colonel.

Col. Bane. Col. Thurman H. Bane.

Mr. LaGuardia. And your present assignment.

Col. Bane. Commanding officer of McCook Field, Dayton, Ohio; Chief of the Engineering Division of the Air Service.

Mr. LaGuardia. How long have you been in the service, Colonel?

Col. Bane. I was commissioned in 1907.

Mr. LaGuardia. How long have you been in the Air Service?

Col. Bane. Since 1916.

Mr. Caldwell. You are a West Point man?

Col. Bane. Yes, sir.

Mr. Caldwell. Where were you appointed from?

Col. Bane. From California, sir.

Mr. LaGuardia. You are a flying officer?

Col. Bane. Yes, sir.

Mr. LaGuardia. Colonel, we have asked you to come before us to testify on the technical side of aviation. We want to get as much information as we can as to the necessity and usefulness of a united air service. Will you let us have your views along those lines? We will let you make your whole statement before we interrupt you.

Col. Bane. May I be sure that I get exactly what you mean? Do you mean the relation of a united air service to the technical matters in connection with aviation?

Mr. LaGuardia. Exactly.

Col. Bane. I have always felt that from a technical point of view a united air service was absolutely essential, for the reason

that you must have control of all the different technical activities having to do with the equipment that goes into an airplane. Under the present arrangement all armament matters are controlled by the Ordnance Department of the Army and all radio matters are controlled by the Signal Corps, and this makes it very bad when we get to putting all this equipment into the airplane at McCook Field into the experimental models. We find that these people who have no knowledge or are not familiar with the possibilities and limitations of the airplane are liable not to consider the necessity of making the armament, for example, especially for air-service purposes.

For example, we have at the present day no machine gun developed absolutely for the Air Service. It is a ground gun, modified to make it suitable for the air. Of course, it would be very much better, from our point of view, to have a machine gun designed from the bottom for use entirely for air-service purposes.

The same thing holds for radio equipment. The radio equipment now that we must put in the corps observation airplanes is in three units, large boxes, and weighs about 85 pounds. I am sure that the people developing this radio are not as thoroughly interested as we are in getting it down in weight and having it less cumbersome so that it will really go into the airplane and still be convenient.

Another thing is this. With the present organization, the Navy, the Army, and the Post Office Department are working along separate lines, and while we try to get in touch with everything that the other people are doing, it is almost impossible to keep accurate liaison with them. We feel that if there was one technical head of the whole thing we might have better coordination in the work that we are doing.

Another very important reason why there should be a separate air service, in my opinion, is that the development of the airplane has merely just started, and it is a great big, interesting thing, and it is hard to conceive that departments in which the Air Service is only a side issue will take the interest and will push to its conclusion the development that a separate service would make possible.

Just as a general statement I do not know that I could add to that. Perhaps you could suggest something else.

Mr. CALDWELL. As I understand it, your idea is to have a separate air service in which you would combine all the activities of the Government and the control of aviation navigation under one single head.

Col. BANE. Yes, sir.

Mr. CALDWELL. Of course, you realize that in time of peace the principal development of the Air Service will not be a war machine, but will be a commercial machine? That is what we hope, anyhow, is it not?

Col. BANE. Yes, sir. While I think that is some time off, that will come eventually.

Mr. CALDWELL. Well, that is the general idea of consolidating it, so as to stimulate the commercial use of the airplane so that we can use it in time of war.

Col. BANE. Yes, sir.

Mr. CALDWELL. So that the use of the airplane for carrying mail is only a forerunner of the use of the airplane for passenger and freight traffic.

Col. BANE. Absolutely.

Mr. CALDWELL. And interstate as well as intrastate communication?

Col. BANE. Yes, sir.

Mr. CALDWELL. The men engaged in aviation pursuits, from the factory on up to the flier—I believe the factory man is lower than the flier, when he is in the air, anyhow, until he falls—those that have in their minds the commercial side of the thing will be considerably more than those who have in mind the military or naval use of it?

Col. BANE. Yes, sir; eventually. I think for a few years——

Mr. CALDWELL. If that is the case, the military and naval status of the men will naturally be absorbed by the civilian status, the commercial status; that is, the commercial status will dominate the service?

Col. BANE. I think the service should be organized so that the men with a commercial status should predominate in production, but not certainly the types of airplanes.

Mr. CALDWELL. How about aviation navigation. Would you have the military people predominate the service, so far as the transportation of freight is concerned?

Col. BANE. Not at all. In other words, I do not think the civilian organization should dominate the military use of military airplanes.

Mr. CALDWELL. Are you going to have in your single organization men who are going to have a military status purely, men who are going to have a naval status purely, and men who are going to be engaged in the civilian occupation of the transportation of persons and property?

Col. BANE. I think there should be a director of civilian aviation; yes, sir.

Mr. CALDWELL. I am talking about the general personnel of the service. Would you have three classes of service, or would you have them all one service?

Col. BANE. I think there should be two. I should think there should be a director of civilian aviation, an assistant director who will have charge of civilian aviation.

Mr. CALDWELL. You do not get my point. My point is this: Are you going to have men, say, in the Army, your enlisted personnel or commissioned personnel, divided into groups, those who are being trained for military and naval purposes, and those who are being trained for civilian purposes?

Col. BANE. Yes, sir; I think you might have to do it that way.

Mr. CALDWELL. Do you think you could get along under a single, united head, with a division of that kind?

Col. BANE. I think so; yes, sir.

Mr. CALDWELL. The man who is flying for the transportation of passengers and property would take the same risk as the man who is training himself for future war?

Col. BANE. Yes, sir; but I would not understand that that man would be in any way in the military service, in the service of the Government. He would be merely a civilian. A commercial concern would employ him to do its work. He would not be on the same status as a military aviator, certainly, sir.

Mr. CALDWELL. Would you think that a military man who goes into the aviation service under a single head should give up his military status?

Col. BANE. No, sir.

Mr. CALDWELL. You do not think he ought to surrender his right to a pension and the right of his family to support, and his right to war-risk insurance, and the right of retirement? You do not think that, do you?

Col. BANE. No, sir.

Mr. CALDWELL. Would you give all of those rights to a civilian employee who flew and took the same risks as a military man, in time of peace?

Mr. FULLER. What interest would the Government have in the civilian employee?

Mr. CALDWELL. As I understand, this proposition is to consolidate aviation activities of the Government, and we have men flying in the Post Office Department, and we expect to have men flying in the Interior Departmet in a short while, and the Department of Commerce, and all those departments that are starting out now in aviation activities. They are going to be flying, and they are going to take the same risk as the Army and Navy man who is simply training now so that if we do have a war he can fly. Do you think he ought to have the same benefits that the Army and Navy men have?

Col. BANE. No, sir. I do not see why they should. They are flying now and seem to be perfectly contented with what they are getting in the Post Office Department. They do not have to fly.

Mr. CALDWELL. Do you think there is anything that makes the life of a man in the Army more valuable to his family than that of the man who is flying for the Post Office Department is to his family?

Col. BANE. No, sir; and no more do I think that his condition is harder.

Mr. CALDWELL. You believe in retirement for Army officers?

Col. BANE. Yes, sir; I believe it is a good thing.

Mr. CALDWELL. Do you believe in retirement for the post-office employee who is doing the same kind of work?

Col. BANE. I do not think I am an expert on post-office employees or civil-service people. I do not believe I am competent to judge. I think they should be entitled to a pension of some sort for their services; yes, sir. That is my personal opinion.

Mr. CALDWELL. You said that by having a single head the development of your technical material you thought would be improved?

Col. BANE. Yes, sir; coordinated, with less duplication, perhaps.

Mr. CALDWELL. Aviation is in its infancy yet, notwithstanding the stimulus of the war, is it not?

Col. BANE. Very much so; yes, sir.

Mr. CALDWELL. Do you not think that there would be a greater inducement to try out all things and hold fast to that which is good if you had five different heads working toward perfection than if you had one head?

Col. BANE. I rather think they might all be doing the same sort of thing, whereas if you had a single head he might assign five separate problems and you would get results more quickly. That would be my attitude.

Mr. CALDWELL. When we got into this war with the other four or five allies working altogether, we got practically all the new things first from one and then another, did we not? They did not all come from one place?

Col. BANE. No, sir; everybody pooled their resources in the way of information, and that tended to help a lot.

Mr. CALDWELL. We have done that already, have we not? The Army does not keep any secrets from the Navy, does it?

Col. BANE. No, sir; but unintentionally perhaps we do. We try to give them everything, but they get a piece of paper that merely records that such and such a thing has been done, but perhaps they are too busy to read the paper and they go along on a side line trying to do the same thing, whereas if there was one head he could coordinate them.

Mr. CALDWELL. Do you not think that with five independent sources of experimentation you are more likely to stagger on to the thing that is going to be a success than if you had only one source of experimentation?

Col. BANE. I do not mean to say that I do not think that duplication in research and scientific work is a good thing, but I say that if the thing were coordinated it would be secured a good deal quicker. Take the case of the Allies in this war. If they had not assisted each other we would not have gotten what we did.

Mr. CALDWELL. I recognize that duplication of service is a useless expense, and I am not talking about going over and over again that which is found to be good, but what I am talking about is the research work. Do you not think that five different sources making a search independently are more likely to find that which is better than if there was only one source which was circumscribing the activities of four?

Col. BANE. I think so; yes, sir. I do not think there should be any effort to locate at one physical geographical location all of these activities. My suggestion was merely that they be coordinated by some one person, and let them stay where they are and have one man having control, so that he can say to this fellow, "You do this," and to this other man, "Do that and lay off of this. This other fellow is doing this."

Mr. CALDWELL. I do not know whether I just got your notion a minute ago when you said something about studying and testing this apparatus which you put in, weighing something like 80 pounds.

Col. BANE. That is the radio equipment, which weighs 85 pounds.

Mr. CALDWELL. Do you think the Signal Corps that produced that had any desire to handicap you?

Col. BANE. No, sir; they just do not know they are handicapping us. There is no way they can know. When we tried to put it in the airplane it would not go in. Right there at Dayton we are changing it so that it will go in in better shape. It is a cumbersome box.

Mr. CALDWELL. Have you ever reported to them that you wanted it in a different shape?

Col. BANE. Yes, sir.

Mr. CALDWELL. What did they say?

Col. BANE. They are doing the best they can to try to correct it, and they will eventually, but it takes a lot of time.

Mr. CALDWELL. Did you suggest to them the way to correct it?

Col. BANE. No; we did not suggest a technical way to correct it, because we are assumed to know nothing about it.

Mr. CALDWELL. That is not the question. Do you know anything about it?

Col. BANE. We do.

Mr. CALDWELL. Do you know how to correct it?

Col. BANE. We would have to do some research to do it. We have not tried to correct it, because we have asked them to do it. I am satisfied we could correct it if we got the task; yes, sir.

Mr. CALDWELL. Do they not want to correct it?

Col. BANE. They are anxious to correct it. Why should we both try to correct it? If it is their job, why not let them correct it? That is the attitude we have taken. They are perfectly willing to do it, but they do not know our requirements as well as we know them ourselves.

Mr. FISHER. Colonel, I think you will find that the committee is trying to find out that which will better the Air Service, and with that point of view I want to ask you whether or not, in the general statement that you gave, the defects that you outlined as being now present in the Air Service as constituted were largely the lack of coordination in the production and in the improvements of the Air Service. Did you not state that there was a lack of coordination now——

Col. BANE. I said that; yes sir.

Mr. FISHER (continuing). In such as the machine gun that ought to have been designed solely for aviation?

Col. BANE. Yes, sir.

Mr. FISHER. And you used technical expressions which indicated that every thought ought to have been for aviation and not other branches of the service?

Col. BANE. That is it; yes, sir.

Mr. FISHER. So that there was a lack of coordination in the development?

Col. BANE. Exactly.

Mr. FISHER. Along technical lines?

Col. BANE. Yes, sir.

Mr. FISHER. Was not that a defect in the personnel of the present Air Service?

Col. BANE. No, sir. The task of development of armament for the Air Service has been given to the Ordnance Department.

Mr. FISHER. Was that done over the protest of the personnel of the Air Service as then constituted?

Col. BANE. Of course, when that assignment was made we had very little in the way of an Air Service. We had just started. There has been a constant protest since that time. I can not answer the question as to whether there was any protest at the time. I think at the time, in view of the fact that we had no organization capable to handle it—we had, I think, 73 officers originally——

Mr. FISHER. That was at the beginning of the war?

Col. BANE. Yes, sir. It was probably a good thing to assign it to them temporarily.

Mr. [illegible]. But shortly after the war there was organized an [illegible] Board, was there not?

Mr. [illegible]. Yes, sir.

Mr. [illegible]. Are you familiar with the work of that board?

Mr. [illegible]. I am; yes, sir.

Mr. [illegible]. You know that their purpose and object was to co-[illegible] the different departments and development as much as [illegible] in the Air Service in all its branches, particularly the [illegible] the Army?

Mr. [illegible]. Yes, sir.

Mr. [illegible]. Was the defect that you spoke of relative to the [illegible] department sacrificing the Air Service for ordnance a [illegible] to this Aircraft Board?

Mr. [illegible]. No, sir; I think the Aircraft Board did a very wise [illegible] assigning to the Ordnance Department the development of [illegible] armament at that time. We did not have the personnel [illegible] facilities to do it, but I think it is high time that we started [illegible].

Mr. [illegible]. Then they were given practically unlimited author-[illegible] they not?

Mr. [illegible]. The Aircraft Board?

Mr. [illegible]. Yes.

Mr. [illegible]. Yes.

Mr. [illegible]. And all the money they could ask for?

Mr. [illegible]. Absolutely.

Mr. [illegible]. And if the personnel of that board had wanted a ma-[illegible] designed solely for Air Service purposes, and radio work, [illegible] have had it, could they not?

Mr. [illegible]. I do not think so; I do not think there was time.

Mr. [illegible]. You mean there was a hindrance in the War Depart-[illegible] the Aircraft Board having the right sort of efficient ma-[illegible] air service?

Mr. [illegible]. I do not think it was that bad.

Mr. [illegible]. Where was the stumbling block? If they had the [illegible] money, and the officers, where was the hitch?

Mr. [illegible]. The element of time. They had to take a gun that [illegible] and develop it quickly. It was quicker to do that than [illegible] the bottom with a new gun.

Mr. [illegible]. Was it not, then, a question of the study of the Air [illegible]?

Mr. [illegible]. Absolutely.

Mr. [illegible]. I mean of the mechanical devices in the Air Service? [illegible] a question of organization of the Air Service, was it?

Mr. [illegible]. No, sir. We were not ready to take it then, but now [illegible] and should do it, from now on. I am not complaining [illegible] anything in the past.

Mr. [illegible]. I want to get that clear that you do not have refer-[illegible] which has gone before in your recommendations now.

Mr. [illegible]. No, sir. This war material for airplanes is quite dif-[illegible] from ground material, and I think that from now on the Air [illegible] and the men in the service should handle it. We are better [illegible] to do it than the Ordnance Department. At the time the [illegible] started, I admit frankly that we were not equipped, and that [illegible] sound thing to do was to do as they did do, give it to the

Ordnance Department of the Army. We had no Air Service when we started.

Mr. FISHER. If there was a lack of coordination in the lines of production under a separate Air Service, do we not run the risk, when we get efficiency along the line of production and improvements, of a lack of coordination of the fighting branches? Do we not run that risk? Suppose we separate the Air Service. Do we not run the risk, when we gain efficiency along production lines and improvements, of falling down in coordination as a fighting machine of the Army and Navy? Do we not run that risk?

Col. BANE. I think there would be little danger of that. I think that can be whipped; I think you can overcome that difficulty.

Mr. FISHER. Do you know anything about the responsibility for the present stagnation of the Air Service? Who is responsible for the present condition of the Air Service? Is it a lack of money, or is it in the personnel of the Air Service?

Col. BANE. Well, I think it is both. The Air Service was composed principally of temporary officers. We had this little nucleus of regular officers, 74, I think was the number——

Mr. FISHER. You think the uncertainty as to the future is injurious to the work of the Air Service?

Col. BANE. Yes, sir. I think that if we had had a strong Air Service organized at the time the armistice was signed we could have gotten a lot of the very excellent men to have remained in the service, and we would not have had any stagnation whatever.

Mr. FISHER. I quite agree with you as to that. I think the lack of permanency has hindered it some. Is the money which could be used for the building of airplane now being spent? Do you know anything about the appropriations available?

Col. BANE. I am sure that most of the money is being spent. They have assigned us $4,000,000 for engineering purposes, and we are spending that as fast as we can intelligently, and the other moneys are being used principally for taking care of this enormous amount of equipment that was held over. I am sure there is no money available that could be put out in orders that has not gone out in orders.

Mr. FISHER. Are you familiar with the requests on the part of the personnel of the Air Service going to the different committees of Congress recently for an appropriation of, I think, $15,000,000 or $25,000,000 for building airplanes?

Col. BANE. Yes, sir; I have seen that.

Mr. FISHER. Were you in Washington at the time, and did you go before either one of the Appropriations Committees, either of the Senate or the House?

Col. BANE. No, sir; I did not.

Mr. FISHER. I believe it was the Military Affairs Committee. The sum of money asked for was denied, was it not, by Congress?

Col. BANE. It was denied; yes, sir.

Mr. FISHER. That was no fault of the personnel of the Air Service?

Col. BANE. No, sir. I understood there was some uncertainty on the part of Congress as to appropriating money for an organization which they did not know exactly what it was to be, and they wanted to settle the question of organization first. That was our understanding.

Mr. FULLER. This question suggested itself as the Colonel was responding to inquiries. Granting that we can gain efficiency by making this a separate department, there is no reason why these airplanes should be operated separately, is there, after they are constructed and designed.

Col. BANE. I do not quite understand that question, I fear.

Mr. FULLER. Well, granting for the moment, for the sake of argument, that we could gain efficiency by making a separate department of engineering, designing, and production, there is no reason why it should be operated, after the airplanes are constructed, as a separate department? You were dealing with that problem a few minutes ago of having it separate all the way through. There is no reason why it should be to make all the production necessary, is there?

Col. BANE. I think it would be quite bad to have a separate department required to design airplanes for military purposes, over which the military had no control, and the same way for the Navy. I think if you have a separate air service it would have to go right on through and control the operations also.

Mr. FULLER. On the field of battle, you mean?

Col. BANE. I get your point. You mean that if airplanes are operated with the Army, they should be under the control of the Army?

Mr. FULLER. Yes.

Col. BANE. Absolutely. I see no objection to that, but there is a great mass of operations that are distinct from the Army, or more or less independent, like the operations of the Navy are distinct from the Army, although they often work together.

Mr. FULLER. Granting that is so, my point was this: We could consider having it separate up to the point of production, including production, and not going beyond that, if the committee saw fit to strike a compromise?

Col. BANE. I think that would be difficult. I might, for example, take the engineering department of the Air Service. We have to operate very closely with Gen. Mitchell. He commences operations and tells us exactly what he wants, and we try to design it. I think it would be quite difficult if there was a separate organization doing designing and not composed of military personnel who could understand.

Mr. FULLER. That is not what I meant. I was inclined to consider your proposal up to the point of production, without going into the matter beyond that.

Col. BANE. Just what sort of organization would you have, sir? I am afraid I do not get you at all.

Mr. FULLER. I was trying to anticipate my friend's objection a few minutes ago, when it seemed to me that he was speaking of the desirability of having it separate after production. I think the advantage is pretty obvious up to the point of production, but how would you separate a ship from the Military Establishment after the airplanes were put into the field, is my point?

Col. BANE. I think the Curry bill covered that point by stating that airplanes operating with the Army or Navy would be under

the Army or Navy commander, but there would be still a big air service that could operate in a strategical way.

Mr. HULL. Following Mr. Fuller's question, I have tried to get the viewpoint of the witnesses that have been before us as to just where they would draw the line. I think we are practically all agreed that a service that would coordinate all three branches of the Air Service, as far as research work, engineering, and production are concerned, would be a good thing in a way. Now, the thing we do not seem to be able to get from the men who come before us is just what they mean by a separate air service, and, according to your statement, if I get you right, you would have a part of that operating in the Army, and still you would have another part that would be separate from the Army?

Col. BANE. Yes, sir; I would provide the Army with the necessary squadrons for Air Service work. Then I would have a large separate Air Service that could act as a first line of defense of the country. The Air Service can go out ahead of the Navy.

Mr. HULL. You would have that absolutely separate from the Army?

Col. BANE. Yes, sir. I see no connection between them.

Mr. HULL. You would not even have it under the General Staff?

Col. BANE. If there is a general staff, as there should be, to coordinate.

Mr. HULL. Well, there is; we think there is; we hope there is.

Col. BANE. I mean a different sort of general staff, a general staff different from the one we now have, coordinating the work of the Army and Navy and the Air Service, certainly it should be under that general staff. If you have three branches of the general service, you would have a combined general staff looking into the defense of the whole country.

Mr. HULL. But you want a separate service the same as the Navy is from the Army?

Col. BANE. Absolutely, yes, sir.

Mr. HULL. Then you want a cabinet minister?

Col. BANE. I am not interested in cabinet ministers, sir; any way you can arrange it.

Mr. HULL. If you are going to have that service, that is a matter of fact in legislation. If you are going to create a service similar to the Navy, you would have to create a cabinet minister.

Col. BANE. I see no harm in that, a cabinet minister.

Mr. HULL. I do not either, if your contention is right.

Col. BANE. Here is my view, Mr. Hull. I feel that the Air Service is a great, new and important arm and that people do not realize the importance of it. It is certainly the first line of defense of this country. We can certainly go out beyond the Navy. While the Navy is getting up steam, we can go out miles beyond them.

Mr. HULL. Yes, I think we are all agreed on that, but it is absolutely new, is it not?

Col. BANE. Yes, sir.

Mr. HULL. And there is not anyone, so far as we know, that has any well-defined proposition in regard to the separation thot will actually substantiate everything that they say. They come in here and tell us they want a separate Air Service, but when you pin them

down, they are off. Do you know of any country that has organized its air service as you would organize the air service of this country, according to your statement?

Col BANE. I presume England is nearer to it; I do not know exactly.

Mr. HULL. You presume; but it is a fact that England has not, but England itself has gone farther than they find it practical, and has fallen down; is not that true?

Col. BANE. I am not familiar with that.

Mr. LAGUARDIA. That is not a correct statement, Mr. Hull. She has not fallen down. We will have Mr. Charlton here.

Mr. HULL. We want Mr. Charlton here. I understand there is a great reaction against their separate air service, and that they have gone a great deal further than they ought to have gone.

Mr. LAGUARDIA. There is reaction by the same interests that were against it in the first place.

Col. BANE. If you admit the necessity of dividing the Army and Navy into two separate branches, here is a great new thing, the air, and I do not see any reason why the air should be attached to the Army or the Navy.

Mr. HULL. But here is a great new thing in the tanks.

Col. BANE. But the tanks operate with the Army in the line.

Mr. HULL. So does the air.

Col. BANE. But there is a portion of the air that we say is out of the area of the Army, sir. Aviation acts with either the Army or Navy. The tanks could not operate with the Navy to advantage.

Mr. HULL. You admit you have got to operate with the Army and the Navy, and you have got to have a part of it, but still you want a separate operation. This is the point I call attention to, that if you are right, you would create a tremendous overhead expense, and that is the thing that we have got to guard against. The people of this country will not tolerate the present expenditures in the Air Service, and I will ask you this: Do you know what became of the $1,240,000,000 that we gave to the Air Service since the war broke out?

Col. BANE. Yes, sir; I know where a great portion of it went.

Mr. HULL. Where did it go?

Col. BANE. In the most wonderful piece of production that has ever been accomplished in the world, in the production of the Liberty motor.

Mr. HULL. They say the Liberty motor is no good.

Col. BANE. I do not say that.

Mr. HULL. You do not think that the De Haviland machine was a successful machine in the air, so far as fighting goes?

Col. BANE. No, sir. It is an observation machine. It is not a fighting machine.

Mr. HULL. Then the Liberty motor as a fighting proposition is not a success?

Col. BANE. Not as a pursuit motor; no, sir.

Mr. HULL. Not as a combat motor either?

Col. BANE. But you must have a motor of that type, and for that type it fulfills its functions splendidly.

Mr. HULL. But if it cost us $1,240,000,000 to build a plane that can not fight, what is it going to cost us to build one that can fight?

Col. BANE. No one had any notion when that plane was built that it would be a pursuit plane. You will never build one plane that will perform all the functions necessary.

Mr. HULL. Why do they put so much stress on the Liberty motor?

Col. BANE. Because there is a great bulk of the airplanes being used for day bombing, and for corps observation work, which must have a large motor of that sort, and this motor will perform that function very satisfactorily.

Mr. HULL. No one thought it could fight in the Air Service?

Col. BANE. That it was a pursuit motor, no. It can fight.

Mr. HULL. I mean as a combat plane?

Col. BANE. No one thought it would make a pursuit plane; no, sir.

Mr. HULL. And that was the whole story?

Mr. CALDWELL. Just a minute. I just want to straighten you out in this way. The Colonel is using the word "pursuit," and you are using the word "combat." A combat plane is a different type of plane from a pursuit plane.

Col. BANE. I think there is a misunderstanding as to terms. No one certainly understood that the De Haviland plane would ever go into the air as a pursuit airplane.

Mr. FULLER. Do I understand that you contend that when the Liberty motor was designed it was understood by those who designed it and brought it out that it was adapted for use in a pursuit plane?

Col. BANE. I can not speak for the gentleman who designed the Liberty motor, sir.

Mr. CALDWELL. That was my understanding of it.

Mr. FULLER. That it was brought out——

Mr. CALDWELL. That it was brought out for a heavier type of machine, not for a pursuit machine.

Col. BANE. We tried to build Spads in this country with the 150 Hispano for a pursuit plane.

Mr. LAGUARDIA. Mr. Hull is talking about the Liberty motor and the De Haviland plane as if they were one and the same. The Liberty motor was not put in a pursuit plane nor in a combat plane. It was put in the DH-4, but it was not something that it was distinctly necessary there; it just happened to have the Libery motor in it.

Mr. HULL. Was not the Spad production stopped during the war?

Col. BANE. It was stopped, yes, sir; before it had gotten well started, on a cablegram.

Mr. HULL. It was to come through as a production proposition, and they stopped it.

Col. BANE. Yes, sir.

Mr. HULL. Well, if it was such a success, why did they stop it?

Col. BANE. A cablegram came from overseas, sir, signed by Gen. Pershing. I do not know who sent that cablegram, but it directed the production to be stopped on the Spad, on the ground that a single-seater pursuit plane was a thing of the past, and they wanted a two-seater pursuit plane. It was an error in judgment, I should say, sir, on the part of somebody.

Mr. HULL. It was almost a tragedy, was it not?

Col. BANE. Quite so. I think it was a great mistake. We should have produced the Spad, by all means. We would have had something then in the way of a pursuit plane.

Mr. HULL. You can not lay that mistake to a lack of coordination?

Col. BANE. No, sir; it was collosal ignorance on everybody's part. We did not know much when we started into this war in reference to airplanes. I do not think anyone did, as a matter of fact, and we did make a lot of mistakes.

Mr. HULL. They told us that they knew everything. I remember Mr. Coffin answering a question; it is in the record. He is one man who told us.

Col. BANE. We had never seen an airplane with a machine gun on it. We knew nothing.

Mr. HULL. They told us they knew all about it, and so did Gen. Squier. We would not have given him $640,000,000 to develop something he knew nothing about if he had admitted he knew nothing about it.

Now, another point. You spoke of Ordnance as though you would have it even separate with regard to Ordnance.

Col. BANE. Have what separate?

Mr. HULL. The Air Service separate from Ordnance.

Col. BANE. Yes, sir; I think the Air Service should design its own armament. You have these special propositions that Ordnance knows nothing about.

Mr. HULL. Who would make it?

Col. BANE. The Air Service. You mean the production?

Mr. HULL. Yes.

Col. BANE. Well, I think arrangements should be made whereby the gun factories of the country would make this armanent if they have to.

Mr. HULL. You have no gun factories in the Air Service?

Col. BANE. After it is designed, if Ordnance can make it, very good; but as we want it they want it. We have to use it.

Mr. HULL. Ordnance never objects to anybody designing anything and turning it over to them; if they can design something better, do they?

Col. BANE. They do not take to it kindly, sir. It has no serious objections.

Mr. HULL. Going back to where we were, if you had a separate Air Service, with a director and four or five assistants in absolute control of the Air Service, both the Navy and the Army, and the commercial side of it, would it not be better to let them develop the thing and find out how far they can go than for us to try to decide that proposition, or for you to try to do it, who are unquestionably very much interested?

Col. BANE. I think that the thing should be a development. I do not think you should reach down into it and fix it forever. If you can fix it so it can be gradually developed it would be a good thing.

Mr. HULL. That is the point I want to understand. If we should enact legislation that would cover this point of turning over to a separate air service research, engineering, and production, and practically all the appropriations, would not that air service then be able to develop this proposition a whole lot better than we can develop it from any testimony that we can get from the Army? You want to remember that the Navy is interested in this, and that the commercial side of it is interested.

Col. BANE. Very much; yes, sir. I think there would be difficulty, Mr. Hull, if the entire operation of airplanes was in the hands of the Army and Navy, and they had to depend on this other organization for all of their designs.

Mr. HULL. Here is the point. If we gave them the organization, with an amount of money or appropriation to control and let them develop their own department, you would have one of these men from the Army to present his side of the case, and you would have one from the Navy. Those men should work together to develop that service.

Col. BANE. You would only develop the production and design end of it, without developing the operation?

Mr. HULL. I would let them develop it just as far as they can, and produce, if possible, a separate service. I do not know myself. I have tried to figure it out, and I think you could probably have training, as far as primary training is concerned, in connection with the Navy and in connection with the commercial side of it, but the minute you go beyond that into a separate service, I am unable at present to find anybody that can explain to me how that service is going to be separate and operate successfully. If you can explain that proposition to me I would like to have you do it.

Mr. FULLER. It seems to me they are distinctly separate. I should think, as a committee, we could take it up to the point of production, and possibly agree there, and then travel on from that point. Would not this separate Air Service, which has to do with its own production, transfer officers from the Army and Navy into it?

Mr. HULL. Certainly; we must transfer practically everything into it, and let them detail back to the Army and Navy the things that belong to the Army and the Navy.

Col. BANE. I had not thought of that, sir; but it looks complicated to me.

Mr. HULL. It is the simplest thing in the world, as far as legislation goes.

Mr. CALDWELL. The Navy did not have any fiasco in their development, did they, that you heard of?

Col. BANE. No, sir; it was much smaller, sir.

Mr. CALDWELL. It was much smaller, but they got away with what they started to do.

Col. BANE. They did not advertise what they were going to do.

Mr. CALDWELL. No; but there was no criticism of their operations and their activities.

Col. BANE. I have heard of none.

Mr. CALDWELL. They trained the men and they never experienced any difficulty over the question of guns or material, did they?

Col. BANE. They did a very excellent job, I am sure, sir.

Mr. CALDWELL. As far as the Army is concerned, they trained more men to fly than any other single organization in the world.

Col. BANE. 16,000 and odd; yes, sir.

Mr. CALDWELL. The men that went over to the other side and who qualified as aviators to go over the lines did as well as the men of any other nation in the world?

Col. BANE. I think so, without question.

Mr. CALDWELL. And acquitted themselves with great valor, skill, courage, and ability, did they not?

Col. BANE. Absolutely.

Mr. FULLER. But they did not go over in American planes?

Mr. CALDWELL. I was not talking about that. I will get to that after a while. The only material that was sent over from this side that they could use was the heavier-type machines?

Col. BANE. Yes, sir; the observation machine.

Mr. CALDWELL. The Liberty motor that we spent so much money and time on and blew so much about was rather successful for a bombing plane?

Col. BANE. Yes, sir. It was entirely successful, for several reasons. They had great difficulty with it in the way it was used overseas.

Mr. CALDWELL. I think I said fairly successful. If I did not, I will do so now. The fall-down, then, is largely a fall-down in the matter of design of the ship?

Col. BANE. I would not say there has been any fall-down, when we consider this thing.

Mr. CALDWELL. We will say failure, then, if it was not a fall-down.

Col. BANE. I would not consider there has been a failure.

Mr. CALDWELL. Well, the inability to get what we would like to have had was largely the inability of the material, rather than of the men?

Col. BANE. I think so; yes, sir.

Mr. CALDWELL. So that the thing we should try to correct here is the possibility of that happening again?

Col. BANE. Absolutely; yes, sir.

Mr. CALDWELL. Now, you think, from your testimony, that you could overcome that shortcoming by a unit of control rather than the unit of control that we had under the aircraft board?

Col. BANE. I would not state that I could cure all in that way. I do not believe this Air Service is going to be a cure-all. I think, without much reference to organization, we can get results. We did not understand much about aircraft when the war started.

Mr. CALDWELL. We had in our production branches representatives of the Wright-Martin motor concern, of the Curtiss, and of all the other engineering concerns or factories in America that were producing aircraft for ourselves or our allies?

Col. BANE. Yes, sir; not military aircraft, but just training machines.

Mr. CALDWELL. I understand, but we had representatives from these concerns on our board?

Col. BANE. Yes, sir.

Mr. CALDWELL. So that we had gone out to every source we had in America and gotten what would have been reasonably expected to be the most skilled men in our country to handle it?

Col. BANE. I think you succeeded in getting the most skilled men in this country.

Mr. CALDWELL. Do you think unity of control would produce better results from those skilled men than those skilled men were able to produce without any control over them?

Col. BANE. I think unified effort, sir, is better than——

Mr. CALDWELL. I understand, but under the law, as I read it here the other day, and I think you were present when Gen. Mitchell was present, were you not?

Col. BANE. Just recently? No, sir; I have not been in Washington.

Mr. CALDWELL. Anyhow, we produced the statute showing the organization of the Aircraft Board and who composed it, the Chief of the Signal Corps, two Army officers, the Chief of the Navy branch and two officers, and we had two civilians at the head of it, both of whom had been connected with aircraft production in civil life in various institutions in the country. Those men were absolute dictators, as far as the law was concerned, as to what we should do. Do you think that by passing a statute we could get better service out of those men or out of any other men than those men could get out of themselves?

Col. BANE. I do not believe you could; no, sir.

Mr. CALDWELL. There is one other question I want to ask you. You thought the guns ought to be made by the Air Service rather than by the Ordnance Department?

Col. BANE. Designed, sir.

Mr. CALDWELL. All right. You realize, of course, that in adopting any kind of machine that uses ammunition one of the prime things that must be considered is the question of the coordination of the ammunition so that a cartridge out of a rifle will fit into a machine gun on the ground or a machine gun in the air, do you not?

Col. BANE. We always had to go over it and pick out the ammunition which was exact. We never used it right out of the pack.

Mr. CALDWELL. I understand, but that is one of the big things in war—that there should be interchangability of ammunition, is not that so?

Col. BANE. Yes, sir.

Mr. CALDWELL. Now, do you think that there is any kind of a department or organization that we have in our country that was better equipped to study those subjects than the Ordnance Department?

Col. BANE. No, sir; absolutely. I stated, I think, that the thing that was done was the correct thing to do when this war started.

Mr. CALDWELL. Do you think in the future you could develop an organization that would be better able to design a character of gun to shoot the character of ammunition so as to have interchangability than the Ordnance Department?

Col. BANE. Yes, sir. We would confine ourselves to their caliber of munition if you would, but we want a gun which will synchronize and shoot through propellers. They were not interested in such things.

Mr. CALDWELL. They were not?

Col. BANE. No, sir; they are not. They do not have to use them, necessarily.

Mr. CALDWELL. You say the Ordnance Department was not interested in such things?

Col. BANE. Perhaps I used the wrong word in saying "interested." I mean they are not familiar with and do not understand the situation like the Air Service official who has to fly these machines.

Mr. CALDWELL. Did not our guns synchronize and shoot through the propellers, the ones we had?

Col. BANE. The Browning gun and the Marlin gun would; yes, sir.

Mr. CALDWELL. The Marlin gun was the one that was finally adopted as the aircraft gun, was it not?

Col. BANE. It was a modified ground gun. The man who goes into the air and finds himself 20,000 feet must depend upon his gun.

Mr. CALDWELL. Under the law the War Department has authority to assign, or detail as we call it, men from one branch of the service to another. Do you think any little defect of that kind or any large defect of that kind could be readily cured by detailing to the Ordnance Department some expert who knows all about these things, who could show the Ordnance Department?

Col. BANE. That helps a great deal, and we have at McCook Field ordnance experts working with us. They make bomb traps also which go on the airplane. They tried to do that away from us for a long time, and we got bomb traps that would not fit into the design of the airplanes. Now, they do it at McCook Field at the engineering station, and they find they can work with us much better, and now the traps go in the airplane. They are built in as a part of the plane.

Mr. LAGUARDIA. Your department takes in the design of planes, motors, and armanent, as far as the technical side of it is concerned; that is the design and improvement?

Col. BANE. Yes, sir; that is correct. You said "armament." I would like to correct that. We do not design armament. We put the thing on the airplane, and ordnance stops there.

Mr. LAGUARDIA. Assuming we had a united air service, with one technical department, whose duties would be to look after the design of planes of all description, all planes used in all Government activities, as well as motors and armament, in your opinion could such a technical department function at less expense to the Government than the present system where we have your department, the Navy Department, and then the Post Office Department and the civilians not included?

Col. BANE. Yes, sir; it would be bound to be cheaper.

Mr. LAGUARDIA. And a properly equipped technical department, with a good personnel, could very easily develop constantly designs in plans and motors for the betterment of aviation?

Col. BANE. Yes, sir.

Mr. LAGUARDIA. It is no part of your duty now, is it, or a part of the Navy technical department's technical duty, to develop planes for postal or other service, is it?

Col. BANE. No, sir.

Mr. LAGUARDIA. And your experience, of course, is that the private industries in this country at this time, especially since the armistice, have received no direct or indirect help, assistance or encouragement from the Government?

Col. BANE. No, sir.

Mr. LAGUARDIA. They have in England, have they not?

Col. BANE. I am not familiar with conditions there?

Mr. LAGUARDIA. Nor with conditions in France?

Col. BANE. No.

Mr. LaGuardia. Would it not be of great value to the industry to have a centralized technical department with a well-equipped laboratory, testing department and library at their disposal?

Col. Bane. Very valuable, I should say; yes, sir.

Mr. LaGuardia. Would not that be one of the functions and duties of a centralized technical department?

Col. Bane. Yes, sir; absolutely.

Mr. LaGuardia. Of an ideal technical department?

Col. Bane. Yes, sir. I would like to insert one thing there. I should think that the design of purely commercial aircraft and military aircraft could not probably be carried on in the same buildings satisfactorily, they are so absolutely different, but they could be coordinated, and the same man could design the propellers, which are just alike, and the same man could design the engines, which are quite similar. The fuselage should be a little separate zone somewhere by itself.

Mr. Caldwell. The experience in development acquired in general design would always be of use to one department and the other department, the general development, would it not?

Col. Bane. Yes, sir.

Mr. Caldwell. Just to clear up this question of Spads, at the time the Liberty motor was adopted it was known then that it would not fit the Spad; there was no doubt about it, was there?

Col. Bane. Absolutely.

Mr. Caldwell. You properly stated that the Liberty motor is a good 400-horsepower motor?

Col. Bane. Yes, sir.

Mr. Caldwell. And its weight and horsepower and size will not permit it to be used in a small machine?

Col. Bane. No, sir.

Mr. Caldwell. That is correct, is it not?

Col. Bane. Yes, sir.

Mr. Caldwell. And you do not claim the Liberty motor to be superior or to be the best 400-horsepower motor in the world, do you?

Col. Bane. Well, I believe I would say that. I do not know of a better 400-horsepower motor, sir, considering consumption in pounds per horsepower hour and weight, and endurance at low altitudes. It is no good above 20,000 feet. I do not know of any 400-horsepower motor that functions at all above 20,000 feet.

Mr. Caldwell. You are aware of the fact, too, that, as is stated, the DeHaviland plane is not a fighting plane?

Col. Bane. No, sir.

Mr. Caldwell. At its best, it is an observation plane?

Col. Bane. Yes, sir.

Mr. Caldwell. And that the first machines that arrived on the other side were defective in that the tank was not protected?

Col. Bane. Yes, sir.

Mr. Caldwell. And you are also aware, of course, that the first squadron of American-made planes was not placed at the front until September of 1918, and that we had one squadron then?

Col. Bane. My memory is not good on the date exactly. It was somewhere along in there, sir.

Mr. Caldwell. And in October, I think, we had four squadrons?

Col. BANE. Yes, sir.

Mr. CALDWELL. As far as the improvement and technical study of aviation goes, you feel, do you not, that there must be this centralized control of the forces of production in order to have that coordination which is so desirable in this particular unit?

Col. BANE. Yes, sir; I believe there should be centralized control. I would not like to be misunderstood. I do not think there should be a centralization of all activities in any one place, but a centralized control, I think, would be very desirable.

Mr. CALDWELL. So that, as I gather your viewpoint, it is this: That you are willing to give to the Infantry, or branch of the service, such air-service equipment as it may desire, but that the fighting, the clearing of the air, so that these observation planes can operate, and maintaining of supremacy in the air you believe should be kept under the control of the Air Service?

Col. BANE. Yes, sir; that is a purely Air Service operation.

Mr. CALDWELL. So that you recommend making the Air Service a coordinate and coequal department of the Government?

Col. BANE. Yes, sir.

Mr. FISHER. You would not question the statement that the Navy was a most efficient fighting machine, would you?

Col. BANE. No, sir; I agree with it.

Mr. FISHER. Will you find among the Navy flyers any desire to have a separate Air Service?

Col. BANE. Those that I have talked with have been against a separate Air Service.

Mr. FISHER. Do you not find the officers in authority or in control in the Navy who directed the flying policy of the Navy all opposed to a separate Air Service?

Col. BANE. I know that some of them are, sir.

Mr. FISHER. Do they not feel that it would decrease the efficiency of the Navy if there was a separate Air Service?

Col. BANE. I have heard them state that sort of thing; yes, sir.

Mr. FISHER. Of course, it is a question for serious consideration if an organization like the Navy, with all its flying officers, with the splendid reputation it has, would oppose a separate Air Service, and it would be a very serious matter for those who would legislate against their judgment.

Col. BANE. I rather think, sir, that they had seen the Air Service, and the lot of investigation we have gone through, and the difficulties we had had in the way of results made them rather suspicious, and they thought it would be a good idea to keep away from us. I think we could cure them of that suspicion.

Mr. FISHER. How do you account for the practically unanimous sentiment in the Navy and the Marine Corps being opposed to a separate Air Service, and in the Army you find a practically unanimous sentiment of the flyers in favor of a separate Air Service?

Col. BANE. Of course, the Air Service is a small organization, and has been an efficient organization, and has not had the difficulties we have had, and they are very well satisfied with what they have realized, which was one reason for it. They do not like to take on experiment and try something else. They rather think we will grab all the good positions, etc.

Mr. CALDWELL. Do you not think it would be a good plan, inasmuch as the Navy has made a success of it, that it would be desirable to throw all of the Air Service into the Navy and let them parcel out something to the Army?

Col. BANE. I am sure I would not want that, sir.

Mr. FISHER. You are familiar with the program of the Air Service relative to the purchase of certain aviation fields, are you not, designated as permanent?

Col. BANE. I am not very familiar with that; no, sir.

Mr. FISHER. But you understand that they have designated a lot of fields for permanent fields, and they have not yet purchased them?

Col. BANE. Yes, sir; I understand that.

Mr. FISHER. Is it your judgment that those fields ought to be purchased, regardless of whether or not we have a separate Air Service; that they are necessary to the Department of Air Service?

Col. BANE. Not knowing what the fields are, I would say, sir, that some fields should certainly be prepared. I would not like to pass on particular fields. I am not familiar with the ones that have been recommended, but we should certainly have some fields.

Mr. LAGUARDIA. Gentlemen, may we go into executive session?

(Whereupon, at 4.15 o'clock p. m., the subcommittee went into executive session.)

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Tuesday, December 9, 1919.

The subcommittee met at 10.30 o'clock a. m., Hon. Fiorello H. LaGuardia presiding.

The following members of the subcommittee were present: Representatives Hull, Morin, Olney, and Fisher.

STATEMENT OF MAJ. BENJAMIN D. FOULOIS, AIR SERVICE.

Mr. LAGUARDIA. Major, you are now attached to the Air Service?

Maj. FOULOIS. Yes, sir.

Mr. LAGUARDIA. And how long have you been in the Air Service?

Maj. FOULOIS. Since its official birth in 1908.

Mr. LAGUARDIA. And you were one of our first flyers, Maj. Foulois?

Maj. FOULOIS. One of the first three; yes, sir.

Mr. LAGUARDIA. And during the war you saw service overseas?

Maj. FOULOIS. I served with the rank of brigadier general and Chief of the Air Service, American Expeditionary Forces.

Mr. LAGUARDIA. General, this committee wants to get all the information it possibly can on conditions of the Air Service and also your views as to just what should be done in order to develop aviation in this country and to have the nucleus of a powerful air force. We will let you make your statement without interrution.

Maj. FOULOIS. As you may know, I presented before the Senate and House committees in October, 1919, a very lengthy statement covering my experiences during the past 11 years in aviation; what

my opinions were as regards the manner in which aviation in general had been handled during that period, and what I thought ought to be done to develop aviation in the United States from a national standpoint. That statement is contained in part 19 of the hearings on the Army Reorganization of the House Military Committee, and as presented to the Senate Military Committee, is contained in part 3 of their hearings on the reorganization of the Army.

From my experience of aviation, both in peace and in war, I believe that the only proper and most efficient way to develop aviation in the United States is to develop it with the prime idea of its national civil and commercial use, keeping in mind that its development should be conducted along such lines that it can be readily made a military asset in time of war. In my opinion, there is only one logical way to accomplish this, in time of peace and under the existing conditions which confront the country to-day (financial, economic, industrial, and lastly, military), and that is to combine every aeronautical resource we have under one head and under one control. There is no doubt in every one's mind, men outside of Congress as well as in Congress, that the biggest problem which confronts the country to-day is an economic one. There is no reason why we should not be economical in the military service and the naval service, as well as in every other service or every other department of the Government, and do our share toward reducing the expense which has grown up as a result of the war. The present disorganized state of aviation is wasteful and will continue to be wasteful just so long as each individual department of the Government endeavors to develop aviation along its own lines, independently of the others. In substance, those are my general views on what is needed to bring the industry up to an efficient and satisfactory working basis.

Mr. LaGuardia. General, a great deal has been said in this committee, and I think a great many of my colleagues are under the impression that the fighting part of aviation should be under the complete control of the Army or the Navy. Will you explain your views on that?

Maj. Foulois. In time of war that expression of opinion, in my opinion, is right. In time of war all resources should be brought under one supreme command in order that responsibility may be properly fixed at all times. My experience in the past 11 years has not convinced me that the military control in time of peace is efficient, nor are our military executive sufficiently educated or trained in aviation matters to bring out the fullest and most economical development of aviation.

Mr. LaGuardia. You do feel, however, that an air service, even in time of war, should have autonomy of administration and freedom of action so far as its own fighting in the air goes, do you not?

Maj. Foulois. Absolutely.

Mr. LaGuardia. It would cooperate with the Army to the same extent as a joint action of the Army and Navy would be under one command?

Maj. Foulois. Exactly. The strictly military uses of aviation, and by that term I mean the strictly Army uses of aviation, are a small part of aviation. That is the part which we generally term as observation aviation. That part must work in very close touch

at all times with ground troops. It must be thoroughly trained with ground troops and must know what the ground troops need. The ground troops must also know the Air Service observation part thoroughly. The foregoing covers practically all that need be said about aviation in its relation to the Army. The Army, however, has never yet appreciated the fact that there is another field for aviation, which is the big field; that is, the offensive use of the arm. Their experience and ideas in regard to military aviation are confined absolutely to the defensive use of it; that is, its use in connection with observation for ground troops. The offensive use of military aviation has been very little developed, and it has a big future ahead of it if properly coordinated, handled, and developed.

The offensive use of military aviation that is, the fighting end of it, and the bombing end of it, consists of at least 75 per cent, or even more, I should say, 80 per cent of the uses of aviation. This side of it is not looked at at all by the Army, nor, in my opinion, by the Navy. They see simply its direct uses in connection with their own work. The offensive use of military aviation goes way beyond the direct control of an army or a fleet. It would go out hundreds of miles away from the direct control of any military command. Normally, the use of observation aviation, as regards its use with land troops, is practically confined to the limits of our artillery. The area within the range of our longest range artillery, can be considered as the area in which army observation can be strictly applied. Beyond that it gets out of reach of an army in the field. In time of war, in active operations, it would be expected that long-range operations by aviation, would be coordinated and tied in with any general policy which would be laid down for military operations in the field and on the sea; but future long range air operations will take military aviation into a realm that is entirely separated from strictly military or naval operations in so far as the ground troops or fleets are concerned.

Mr. LaGuardia. And that was developing almost daily during the last war.

Maj. Foulois. Yes; it was developing daily during the latter days of the war, and it would have developed much more rapidly except for the fact that the industry was in such a condition at the outbreak of the war, not only with ourselves but with all our allies, that it was absolutely imperative to throw every energy into the development and production of equipment for "observation" aviation, that is to first take care of the needs of the ground troops, a policy which was thoroughly understood and accepted by all of us. This policy also involved the production of a certain amount of "combat" aviation to protect the "observation" aviation from hostile harrassing air services. As a result, it took all the energies of these new industries, throughout the first 3 years of the war to provide for the needs of the ground troops. Toward the last year of the war the needs of the ground troops had been well taken care of. The next step was to go into the more extensive offensive use of military aviation, which involved the greater development of the "bombing" and "pursuit" types of planes, and during the last six months of the war this development was just beginning to be felt.

The offensive use of military aviation needs a little more explanation in order to clear up some of the points which I think have been brought out during the testimony for and against the consolidation of aviation, especially in connection with the effect of bombing. It has been thought that bombing during the recent war was more or less ineffective. I might quote just one illustration of an experience I had in London in December, 1917, when the Huns sent over a small bombing squadron of about eight planes, so far as we could determine. The "alert" was sounded at 8 o'clock. That squadron flew over London, dropped several bombs, one of which I recollect landed about 50 yards from where Col. Gorrell and myself were standing, and killed three or four people. The "all clear" signal was given at 12 o'clock, and during those four hours not a wheel turned in London. Now, when eight airplanes can stop the entire business of a city the size of London——

Mr. LaGuardia (interposing). Was that in the daytime?

Maj. Foulois. No; at night—you have got a pretty potential factor for use in war. The total material damage done by bombing in London I understand amounted to something like $75,000,000. That is my recollection of the amount I heard after I left there.

Mr. Olney. $75,000,000.

Maj. Foulois. I think it was $75,000,000.

Mr. Olney. The total amount during the war?

Maj. Foulois. Yes; from just these infrequent raids which they had there. That was the physical damage. The damage done in the loss of "man hours" and the damage to morale was a very vital factor in all the raids on London. The material damage with a small number of planes like that you can readily see would have practically no more effect than the same number of guns, but when you multiply that by several hundred or several thousand, you can begin to count your material damage. The material-damage side of it is the side that the military men look to, as a rule, and naturally they say that there was very little done, and everyone admits it, but they do not say why it was not done.

The reason why it was not done is because the development of airplanes for strictly offensive purposes was not allowed until toward the end of the war, due to the imperative needs of the ground troops in observation types and certain of the pursuit types, a military condition and necessity which was fully recognized by airmen as well as by military men. The offensive use of the airplane, as I say, is the side that must be developed if we really intend to get supremacy of the air at any time. You can not get supremacy of the air any more than you can get supremacy on land by sitting still or just staying on the defensive. You have got to take the offensive, and you can not take the offensive against any first-class power with observation types of planes, which is the only type that the Army really sees any use for from its military viewpoint. The keynote of all of our work in France was the offensive. That always has been and always will be the American policy when we take the field. In order to develop a proper offensive air force you have got to have reserves. You have got to have a lot of personnel trained, and you have got to have a great number of machines available at the outbreak of any war. It is not within reason, in my

opinion, to expect that the country is going to provide appropriations for a large military standing air force any more than it is going to provide appropriations for a large standing Army.

There is just one way to provide for a large air force, and that is to develop it through civil and commercial uses, and make it pay for itself in time of peace and have it as a military asset in time of war. In my opinion this could be done if you put every aviation activity together somewhere under somebody who will run it and who can accept responsibility to the United States for its proper and efficient development. We can not do it to-day. Every department of the Government practically has certain uses for aviation. The Post Office Department to-day is playing the leading part in the development of aviation, aside from the military and naval uses. There is a big field for development there. It can be the pioneer of the civil development in the United States. You have another very important use which is just being touched, and that is in connection with forestry work, the protection of the forests. You can pick up the paper almost any day now and find that you are getting a shortage of paper, you are getting a shortage of lumber, and you are getting a shortage of everything that has to do with forestry work. The report of the Secretary of Agriculture recently came out very strongly in connection with the question of forest conservation. The losses, I believe, approximated something like fifteen to twenty million dollars in fires during the last year, and according to the statistics of the Department of Agriculture all your virgin forests are fast disappearing. The southern forests will last about 10 or 15 years with their virgin growth at the present time.

Mr. OLNEY. Would the airplane be effective in locating the fire?

Maj. FOULOIS. The airplaine was effectively used this last fall. We did it, voluntarily, so to speak. The Forestry Department asked for airplane protection in the western forests.

Mr. OLNEY. Would explosives be useful in fighting forest fires?

Maj. FOULOIS. In my opinion you can readily develop fire extinguishing chemical bombs for that purpose. The big thing in connection with forest fires, just like any other fire, in my opinion, is that if you find it quick enough you can put it out; and there is no instrument to-day that can find a fire quicker than an airplane. There are a great many miles of forests out through Idaho and Montana and Washington that are almost inaccessible. In the dry season these fires are started by lightning, and they do not find them until they are well under way and until they have swept over and destroyed a lot of valuable timber. As I say, one of the biggest fields and one of the most important fields in the development of aviation is in connection with our forest reserves, both public and private.

Mr. LAGUARDIA. And the Post Office Department.

Maj. FOULOIS. Yes. These are two departments where we can start right away. The point I want to especially bring out is that behind all of our needs is the necessity for maintaining an industry in the United States. We must not be compelled to start in again the way we did at the outbreak of the war; that is, start in with nothing and try to build it up. If you do it again it is going to cost money. Even to-day, or within the next six months, if we had to go into Mexico, what we would have to do, in my opinion, would be to start prac-

tically over again and that means an unnecessary waste of money. I am not so much worried about fighting the Mexicans in the air as fighting that country down there. I had a little experience along that line in command of the First Aero Squadron when we went into Mexico in 1916 with Gen. Pershing. The most difficult thing we had to contend with was not the Mexican but his climate, his deserts, and his mountains. You must have good planes, especially "multiple-engine" planes, and you must have well-trained men, to buck that country. We have not got the planes nor the men to-day. It just simply means that if we go in there to-day or six months from now, unless the industry is built up, you will go in there and spend lots of money and lose lots of lives, just because you were not properly prepared for it.

Mr. LaGuardia. You have been down in Mexico, Major?

Maj. Foulois. Yes; on one flight to Chihuahua City, Mexico, I was put in the penitentiary upon landing in Chihuahua City.

Mr. LaGuardia. But you were not ransomed?

Maj. Foulois. No. Consul Letcher got me out, fortunately.

Mr. LaGuardia. General, talking about our industries, a great deal of assistance could be given to our aviation industry in this country and not, of course, by way of subsidy, but by reason of the fact that if we had a proper Air Service we could establish fields all over the country, we could have a centralized technical department where they could go for technical advice and assistance, and we could have an experimental station and test station, and in that way render the assistance which the industry would require; is not that correct?

Maj. Foulois. That is correct; and right along that line, on the question of subsidy, we all fully appreciate what a difficult problem it is in handling a problem of that kind. My idea in connection with this is that we can establish a fairly good industry by taking the Army needs and the Navy needs, the Post Office needs, the Department of Agriculture needs, the Fisheries needs, and a great many of the other needs of the departments that we can use aviation for, and you can develop a fairly good sized industry in this country by developing the governmental and commercial uses for it, thus doing away, at least for the present, with the question of subsidies.

Mr. Olney. Do you anticipate, General, that the airplane can be used as a carrier of freight and express?

Maj. Foulois. Without doubt, that will come. I do not think there is any question about it. For instance, some of the planes that are contemplated for use in the Post Office Department to-day will carry from three to four thousand pounds. There are a great many articles of express and freight that could be handled. As an illustration of how the development of the airplane mail has gone ahead, the machines which the Post Office Department are using to-day, or started in three or four weeks ago to use, between New York and Chicago, and if I have the figures of the Postmaster General correct, can carry all of the letter mail daily from New York to Chicago. There is some advantage in that because you are putting your letter mail in Chicago from 12 to 15 hours earlier, and one plane can carry something like 60,000 letters. I think they have on several occasions counted the number of letters that leave the New York

post office that go to Chicago daily, and that all of this letter mail can be carried to-day by one airplane.

Mr. LaGuardia. General, while it is very easy to say that, the Post Office Department has since learned, I am sure, that in order to establish a daily communication between Chicago and New York, we still have a great way to go in this country so far as equipment is concerned.

Maj. Foulois. Right.

Mr. LaGuardia. We have to establish the fields, signal stations, controls, etc.

Maj. Foulois. In fact, we have yet to establish 90 per cent of the work.

Mr. LaGuardia. Exactly.

Maj. Foulois. The flying end of it is approximately 10 per cent of the aviation problem, just as the military use of the airplane is only 10 per cent of the whole problem. This latter statement is one of the chief arguments for a combined Air Service under civil control, as the military high command, particularly, are not familiar with the industrial, mechanical, and technical features of the work, nor have they sufficient practical knowledge of it to appreciate the fact that the military end of it is simply 10 per cent.

Mr. LaGuardia. General, in your experience as chief of the Air Service, did you find that the Army and Navy were overlapping in their work which caused additional expense to the Government as well as a waste of energy and time?

Maj. Foulois. My chief experience in connection with the work between the Army and the Navy occurred in Europe, and I have gone into considerable detail in covering that in my previous hearings before the House and Senate military committees. The statements made in those hearings cover a great many of the difficulties which the Air Service of the American Expeditionary Forces had to contend with in connection with its development in France, primarily on account of the fact that there was lack of cooperation between the Army and the Navy, both in Europe and at home, a lack of cooperation which came very near being disastrous to us. You, Mr. LaGuardia, personnally had certain of that experience in Italy, which I quoted in my previous hearings.

Mr. Olney. General, there is an interesting question involved in taking all the mail from New York to Chicago.

Maj. Foulois. This was the letter mail only.

Mr. Olney. Yes. I have always thought that the carrying of the mail through the air was not a paying business proposition. Have you any idea what the railroads would charge for the transportation of all the letter mail from New York to Chicago and return.

Maj. Foulois. That has been interesting me.

Mr. Olney. That would be an interesting question.

Maj. Foulois. I have been collecting figures on it. I have been trying to get that data, realizing that there is no use in arguing the uses of the airship or airplane for any of this kind of work, civil or commercial, unless it can be a paying proposition.

Mr. Olney. Offhand, can you give the cost of a round trip with a machine such as you have described, carrying 60,000 letters from New York to Chicago?

Maj. FOULOIS. No, sir; but I have some other figures here.

Mr. OLNEY. Would it cost approximately $500?

Col. HICKAN. Much more than that.

Maj. FOULOIS. Colonel Hickan is head of the Information Service and probably can give you a lot of data like that which would be very interesting. I have been working recently in collecting this kind of information in order to find out actually what the relative cost was for airplane mail as compared with railroad mail, but have not complete information as yet.

Mr. OLNEY. Do you think it would be a saving over railroad transportation?

Col. HICKAN. It would not be fair to say that, but I might say for the benefit of the committee that if you gentlemen will hand me a list of the questions that you want data on, I will be glad to turn over the entire facilities of the office in getting such data.

Mr. HULL. Maj. Foulois, are you familiar with the bills that are now pending in Congress in regard to a separate Air Service?

Maj. FOULOIS. I have with me, Mr. Hull, the only bills I am at all familiar with, Senator New's bill, which was introduced in the Senate, Mr. Curry's bill, H. R. 9804, and your own bill introduced November 5, H. R. 10380.

Mr. HULL. In what way do they differ?

Maj. FOULOIS. The most of my study has been on Senator New's bill and Mr. Curry's bill. I have only recently started to study your bill.

Mr. HULL. How far does Senator New's bill go in regard to personnel and operation, or in what way does it differ from the Curry bill?

Maj. FOULOIS. There is very little difference as I gather between the two bills, mostly a difference in phraseology.

Mr. HULL. Do you understand that they would create a separate department so far as a Cabinet member is concerned?

Maj. FOULOIS. I made a note here to look up the statutes referred to in here, and I am not sufficiently famliiar with that to state.

Mr. HULL. You do not know whether they create a Cabinet member or not?

Maj. FOULOIS. Offhand, from reading the first part of these two bills it was my impression they did not create a Cabinet officer, but I would not be certain of that.

Mr. HULL. How far would you suggest that they go?

Maj. FOULOIS. Purely in the interest of national development of aviation I would like to see Congress go the "limit" on the development of aviation, and I say this not as an Army officer, but as an American citizen, and if we can not get that, then I would say go just as far as you can consistent with existing policies. In my opinion the big thing and the prime thing in this matter is not the question of a Cabinet officer as the head of aviation, but to combine all air activities under one head and under one control, whose primary duty would be the development of national aviation. That is the difficulty that exists today. We would go ahead wonderfully if you could consolidate all the aviation activities in the different departments and different branches of the Government and could get somebody who will confine their efforts to aviation as a primary thing and not as a secondary or minor thing.

Mr. HULL. I think we are all practically agreed on that, and that was the thought I had in the drafting of my bill, and I think if you will study that bill you will find that it absolutely does that in very simple language.

Maj. FOULOIS. I have not had an opportunity yet to thoroughly go into it.

Mr. HULL. But there is no question about the fact that it does not go into the personnel or the operations at all.

Maj. FOULOIS. That was one of the points which I think I noticed in that bill.

Mr. HULL. And so far as I can see, and I want to get your opinion on it, when you go beyond that, you get into a maze where nobody agrees. Every witness we have had before us has had ideas, but they do not agree with the next man following in regard to how far they would go nor how they would accomplish the purpose. It is easy enough to state what you want, but it is a very hard thing to put it into legislation and get it enacted. For instance, how far would you go in regard to operations in the field separate from the Army?

Maj. FOULOIS. If I had anything to say about it in connection with operations in time of peace, I should limit practically the Army operations to what has been, I think, incorporated in both Senator New's and Mr. Curry's bill—the last ones——

Mr. HULL. You say limit it how?

Maj. FOULOIS. I mean that I would separate "offensive" aviation from "defensive" aviation; that is, turn over to the Army such "observation" aviation as they need for their work with troops and operate the rest of the aviation in the interests of national aviation as a national air force. I do not mean by this that we should maintain in this other department a big inactive military standing air force. I believe in taking this air force and make it work, and make it work for the civil departments of the Government.

Mr. HULL. But if I understood you, you would have an organization for offense and defense, separate and outside of the General Staff?

Maj. FOULOIS. Yes; I would.

Mr. HULL. You would?

Maj. FOULOIS. Yes; exactly.

Mr. LAGUARDIA. One thing we want to get away from is that General Staff.

Maj. FOULOIS. I have a great deal of respect for certain functions of the General Staff for Army operations. I have had enough experience in twenty-odd years—I am now on my 22d year in the Army—and I am a firm believer in a great many of their principles and of the things they should do, but I am not a believer in any one trying to run something unless they know something about it themselves. This statement is based on 11 years of practical experience in aviation, and 22 years of experience in the Army. Every man who goes on the General Staff to-day, as a rule, knows something about the Infantry, Cavalry, Field Artillery, Coast Artillery, and all the older branches of the military service. Such men can never learn anything about aviation unless they get into a flying machine or get their hands dirty once in a while around them. This is my

chief contention against past and present methods of military administration of the Army Air Service. I would be perfectly willing to see all air activities put under the Army or all of it put under the Navy, or all of it put under somebody who takes enough interest in it, enough national interest, outside of their own military interest, to go ahead and live up to what they say ought to be done.

There has been most influential testimony before the House Military Committee and before the Senate Military Committee by the opponents of a consolidated Air Service as to the importance of aviation, yet right on top of these statements they say they will not sacrifice the interests of the other branches of the service for aviation. Due to this latter statement, I contend they will not effectively develop aviation under military control, although they all say it ought to be done. Why? Because, in the final analysis, it means that if they have got to develop it and Congress will not give them enough money for it, what is going to happen? Congress may cut off two or three regiments of Infantry or two or three regiments of Cavalry or Field Artillery, or something else, in order to build up aviation. Such action, of course, means loss of promotion, and every member of Congress knows what that means to-day in the Army. If the Army is ready and willing to admit that aviation is a big thing and is willing to sacrifice something to help build it up, then I say turn it over to them and let us go at it. But you can not get that in a thousand years.

Mr. HULL. I do not agree with that last statement. I will agree with you that there are a great many things that we have a grievance about with the General Staff.

Maj. FOULOIS. I have no personal animosity against the General Staff at all, individually or collectively.

Mr. HULL. I have as much grievance against the General Staff as any other Member of Congress, but this is true: We will never succeed in creating an Army force outside of the General Staff. You can not do it, and what you have got to do, as I look at it, in all these things, is to reform the General Staff. Now, whether that can be done, I do not know, but I think it can.

Maj. FOULOIS. I hope so.

Mr. HULL. As I look at it, it is absolutely absurd, and if we went onto the floor of the House with a bill creating a department outside of the General Staff for defense or offense, we would be laughed out of the House.

Mr. LAGUARDIA. We will be laughed out of the House if we go in and leave it under the General Staff.

Maj. FOULOIS. How would it do to put it before the House on another basis, Mr. Hull—that is, put it on the basis of economy to the Government, and on the basis of efficiency? That would be my attitude on this thing. I would put it absolutely on the basis of economy and efficiency, and I am willing to go on a debating platform anywhere and debate it for the next 20 years with any officer of the General Staff, in order to show you that they can not efficiently and economically develop and operate aviation under the present conditions, with part of it in the Army, part of it in the Navy, part of it in the Post Office Department, and part of it in every other department of the United States Government.

Mr. HULL. As far as I know, they are not asking to do that. They do not object, and so far as I know, the Navy does not object to a

separate and unified Air Service as far as research, engineering, and production goes, and a good many of them will agree on primary training. I do not know and I have not found anybody yet that knows absolutely in regard to the matter——

Maj. FOULOIS. I will tell you something about that. Right to-day we have got a request to train quite a number of the naval officers, and we trained them in France and we trained them here in the United States during the war. Now, that should be sufficient argument to show that primary training should all be done under one head.

Mr. HULL. That is as far as they go. But the Secretary of War, who has studied this problem to some extent is opposed to it, and the Secretary of the Navy is opposed to it.

Mr. LAGUARDIA. But the Assistant Secretary of War is not.

Mr. HULL. No; Mr. Crowell is in favor of it.

Mr. LAGUARDIA. Because he has studied the subject.

Maj. FOULOIS. As I say, the only thing I am interested in is to see it developed nationally.

Mr. HULL. If you create a department of aeronautics, turning it over to a director who has absolute authority, as you expressed it some while ago, over all these matters, give him everything that is in the Air Service and turn over to him the appropriations and say to him, "Your department is to run the aviation program of this country and find out how far you can go," have you not done all that you dare to do? Have you not given them enough authority? If they can operate it they can demonstrate that. I do not think they can, as a matter of fact, but I am not arguing that point. That is a matter for the department of aeronautics to demonstrate. We can not put it into legislation, as far as I can see, because there is no unity of opinion in regard to it, but you can turn over the commercial, the Army, and the Navy aviation program to a department which will be big enough to study the problem and to find out what they can do, and if you try to go any further than that, you are going to get into a sea where no man knows where or how you will come out. It is a maze. I can not see through it myself, and I do not see why that is not going just as far as we can, and I would like to ask you if you do not think, yourself, that with that kind of a department started it could be handled quite satisfactorily.

Maj. FOULOIS. This would depend a good deal, in my opinion, on how thoroughly and how much authority you turned over to the Director of Aeronautics, and how much apparatus you turned over to him.

Mr. HULL. Turned it all over to him.

Maj. FOULOIS. And how much money?

Mr. HULL. He would have the money.

Maj. FOULOIS. And how much personnel he has turned over to him to carry on his operations. It is very easy, in my opinion, to sit down and say all these things, without giving him the wherewithall to do it. My experience in the last 11 years, starting in 1908 is that first we would get the money, and then we would get no men. Then, we would get the men but could not get the money. That is the way it was for the eight years, prior to 1917, and we never had anything coordinated for eight years because we never specifically provided for

it in air legislation during that period. What I am figuring on now is this: Suppose your bill provides us the wherewithall and the authority to take over this problem?

Mr. HULL. It gives you everything that the Director of Aeronautics would want. This is what it does. I do not know whether the people who are directly interested would agree that the director himself can turn back to the Navy and turn back to the Army the things he does not think he can handle, and it makes him responsible for the things he tries to handle. You put a big, broad man on the job, and he is going to take the responsibility. I am not supposing he is going to try to do something that will fall down. He will go at it slowly and be sure of his ground. He will turn back to the Army and the Navy what he does not think he can handle, and let them do the things they are doing now successfully until he finds a way to do them better himself.

Maj. FOULOIS. I agree with you in that your plan would be very advisable, if we did not know where we are to-day, to give us something to work on, to develop. But I would supplement and extend your bill in order to do just exactly what we had to do at the outbreak of the war, that is, provide for every possible emergency of the future. I admit we had to make quite a number of guesses, but we had to do that with a whole lot of things throughout the entire war.

I would recommend that you supplement and broaden your bill and that you go into the question of personnel, because we could not do a thing——

Mr. HULL (interposing). It turns over to the man in charge——

Maj. FOULOIS (continuing). With lands and buildings and tools and equipment without men; your bill does not turn over one single enlisted man or officer.

Mr. HULL. He can ask for them.

Maj. FOULOIS. Will he get them?

Mr. HULL. If he does not, he will have a straight case against the General Staff.

Maj. FOULOIS. I would like to see that put into the law now. I think your bill should be supplemented in that way. Then you would have the machinery and the tools and you would have the men to use the tools.

Mr. HULL. But we have the General Staff, which is the highest authority in the Army, or on Army matters except Congress.

Maj. FOULOIS. Yes; officially.

Mr. HULL. Officially it is. They are supposed to know. You can not create another department with the same amount of authority and get along. You have got to place that authority somewhere. I will admit, as far as I can see——

Maj. FOULOIS (interposing). We might follow that out in a parallel case and take the question that has been discussed as regards promotion and pay. The Army is not united on those things, itself.

Mr. HULL. Certainly not; they come to Congress to decide them, and Congress will decide those things for them.

Maj. FOULOIS. If you put the question of promotion up to the Army as a body, and not simply confine your investigations to that portion of the Army in the vicinity of Washington you will find that the Army does not agree with the General Staff.

Mr. LaGuardia. Then let us not go to the General Staff and let them decide for us what the aviation policy shall be.

Mr. Hull. They decide the matter of promotions.

Mr. LaGuardia. On the matter of policy the only thing we are striving for is to leave the decision in regard to military policy in the hands of Congress, where it belongs, and leave the matter of administration to the Military Establishment. Let us not make a mistake on that matter and let the General Staff decide our policy for us, which is the very thing we are trying to overcome.

Mr. Hull. But the administration of the policy must be with the General Staff.

Mr. LaGuardia. Absolutely; but we should learn from past experience. We do know that here is a third coordinating branch of the Military Establishment, which is different from the Army, just as the Navy is different from the Army. If you will take the Congressional Record at the time the Navy was created as a separate department, and read the debates in Congress at that time, you will find that they had the same prejudices against the Navy that exist to-day against the Air Service.

Mr. Hull. But they had to go slowly, and they had to absolutely demonstrate that the Navy is a separate department.

Now, I do not know but what you are going to demonstrate that the Air Service is, too; but you have not demonstrated it as yet. When that time comes we will give them the authority, but the administration of this service at the present time must be under the Navy, under the Army, under the Post Office Department, and under the Forestry Bureau. But you can have a separate executive department.

Mr. LaGuardia. Does the Post Office Department control or have anything to do with the administration of the work of the locomotive engineer, the fireman, or the brakeman on the train which carries the mail?

Mr. Hull. Certainly not.

Mr. LaGuardia. The post office delivers the mail to the train and it is carried by the railroad. Why can we not, in carrying on a program of maintaining a large number of men in flying efficiency, instead of having them making circles over a field, have them travel from one point to another and carry mail in their fuselages instead of having nothing there? What function of the Post Office Department enters into that?

Mr. Hull. Now, you are asking for a separate executive department, from a Cabinet officer in charge all the way down?

Mr. LaGuardia. All the way down to the messenger.

Mr. Hull. You would have a separate general staff?

Mr. LaGuardia. No. What would happen where there is a joint operation on water and land? There would be one supreme command, would there not?

Maj. Foulois. Yes.

Mr. LaGuardia. When we went to Tampico and landed troops there the Navy cooperated with the Army. The same thing happened at Gallipoli, where there was a joint operation.

Now, then, when the Army is operating in a given sector, what happens? The commander wants a line on the enemy's movements

and his bases, and to get that from his observation; but his observation can not function to-day unless the air is kept clear so that they can function. The keeping of the air clear—the protection of those observation planes—is a function of the Air Service, and they should have independence in the air, at least.

Mr. HULL. You would take over the naval personnel?

Mr. LAGUARDIA. Absolutely.

Mr. HULL. They have demonstrated in this war that they can function satisfactorily.

Mr. LAGUARDIA. As a Navy.

Mr. HULL. Yes; as part of the Navy.

Mr. LAGUARDIA. Purely as a naval operation. As a representative of the United States I fixed the price with the Italian Government which the Italian Government was to be paid for their planes. What happened? The Navy came down and offered $40,000 for the same plane I had purchased for $20,000 under an order from Gen. Foulois, Chief of Air Service, American Expeditionary Forces. Their boys trained with my boys in the bombing school in the northern part of Italy, and there was no difference between my boys and the Navy boys except in name. Their mechanics got more pay, and on that account we almost had a strike among our mechanics.

Mr. HULL. What we want to find out from these gentlemen is what they think about it and what the differences are.

Maj. FOULOIS. We would not have dual General Staff control. We would not have an air general staff and an Army general staff in dual control in the field.

Mr. HULL. We do not want dual control on the field of battle.

Maj. FOULOIS. The effects of that was well illustrated in France before the allied armies finally operated together under one command. The thing I am insisting on is this. Aviation is not primarily military, but is a military asset in time of war; that is what it is. Must we have this problem, which in peace or in war is only 10 per cent military, controlled entirely by the military, when 90 per cent of that problem is technical, mechanical, and industrial?

Mr. HULL. If you create a director of aeronautics, will that not help solve the problem?

The director of aeronautics need not necessarily be an Army officer or a naval officer.

Maj. FOULOIS. You do not need to have a General Staff officer in it, but just plain, ordinary common-sense Americans with hard, practical experience in aviation, supplemented with a good working knowledge of military rules, regulations, discipline, and the art of war.

Mr. HULL. You want men in there who have had actual experience and then they would work out all these problems.

Maj. FOULOIS. Exactly.

Mr. HULL. That is all you can do.

Maj. FOULOIS. Exactly.

Mr. HULL. When you do that you have done everything you can. If you try to do more than that you will find that you can not do it.

Maj. FOULOIS. Let me illustrate that by something that happened just before the war.

Mr. HULL. If you read closely the bill which I have introduced I think you will find that that is what it does.

Maj. FOULOIS. Except that I do not think it goes far enough. I spent nine years trying to get something done prior to the war. As I stated before, first we would have money and then we would have no men, and then we would have the men and no money. In other words, the two chief necessities were never tied up together.

It finally resulted, just before the war, in my coming to Washington and drawing up a bill that provided for every conceivable thing that we needed in aviation. Up to that time the Quartermaster built our houses, the Ordnance Department furnished the guns, and so on. Every other department could get their needs taken care of but we could not. That is why I say we must go into more legislative detail in regard to our needs in order to efficiently operate.

Under your bill, Mr. Hull, which in general principles is right, it seems to me you should go into more detail and give us more machinery, especially the personnel, to operate with. I know that if this plan for a united department is adopted, then our trouble will have just commenced. It will be nearly as hard a problem as it was when the $640,000,000 bill was passed. When that bill was passed I told Gen. Squier that our work had just commenced. I said now we have to prove up.

Mr. HULL. And they did not prove up.

Maj. FOULOIS. I was in France. But our work will have just commenced if any one of these bills becomes law. We must have enough elaboration of your bill to give us the working machinery and the men and the money to put the proposition through. The men are not in it.

Mr. HULL. We are dealing with something absolutely new, a very big thing, probably the biggest thing we have had to deal with since this country became a country, so far as defense is concerned. There is no analogy. People who try to draw analogies between this and some other department make a mistake, because their is no analogy. It does not do any good to look back upon our mistakes, to hark back to them, and it does not do to look at the foreign countries and to say this foreign country is doing this or that. They have all fallen down in the matter of the air service and made mistakes. It is an absolutely new proposition, and I think if you create a director of aeronautics, no doubt the President, I presume, would choose a big man for that job, and a man who would be willing to make a great many sacrifices in order to show that he is able to handle the job. That is about all you can do, and give him enough authority so he can do the work efficiently, as it should be done, and if he wants more authority he can come to Congress, and he will get it, and if he has a good case, he will get any kind of authority he wants. But if he can not come to Congress with clean hands and make out a good case, a meritorious case, he will not get the authority he wants. We will be the judges of that.

Maj. FOULOIS. Let us take another view on that line. Most of the testimony before Congress in connection with aviation has been along two general lines. First, most of the testimony for a united and consolidated air service has been received from men who have had air service experience, and most of the testimony against consolidation has been from the men who have the theory but not the experience.

Mr. HULL. I have heard practically nobody who has been against the broad idea.

Maj. FOULOIS. No; they can not be.

Mr. HULL. They are not against that.

Maj. FOULOIS. But the broad ideas are all laid down in theory, and the only way of working them out to full and efficient practical application is by hard, practical experience. That is why the practical flying men insist on the development of aviation as a national asset, basing their opinions on experience and on the lessons we have learned during the war and during the last few years of peace, and they are positive that national development of aviation and the aircraft industry of the United States will not receive its just and rightful prominence if governed by theory alone. In my own experience I think I fully appreciate the fact that when we lay our cards on the table we can get better results from Congress, and always have.

Mr. HULL. I wish all the officers in the Army would learn that.

Maj. FOULOIS. I do know this, that what has been accomplished in the past has caused many of us to travel a pretty hard road, and it is a road I hate to see aviation going over in the next 10 years. The industry to-day is practically dead. If your bill is passed in its present form, and you leave it up to an executive department without going into greater detail, the aircraft industry will die in the details in the bills of Senator New and Mr. Curry will get certain things done, which can only be accomplished on account of their more specific terms. While on the subject of more detailed legislation, I might state that before you get through with the reorganization of the Army you will have two problems to settle. One of these problems is the question of promotion, and you never will settle the question until you make more specific legislative provisions and until you hear the opinions for and against it, not only the opinions in Washington, but the opinions throughout the entire Army. The other problem is equally as important and has to do with all proposed legislation that comes from the War Department. In my opinion Congress ought to first determine if such legislation interests more than two departments, and if it does, whether those departments or a majority of them agree to it. If a majority of the Army disagrees, such proposed legislation should go back until a majority agreement is reached. When you can get that principle laid down in law you will relieve the War Department of about 90 per cent of its troubles. In order to get legislation such as this Air Service legislation before Congress the practical fliers have been called disloyal, but in order to get our case before you we have dared to openly express our opinions in a manner which is not entirely customary in Army routine. Why? Because their lives depend on this game.

Mr. HULL. You do not have to argue with this committee about the mistakes of the General Staff.

Maj. FOULOIS. It is the system, the policy. I do not mean to indulge in any personalities in discussing this matter. I am trying to impress upon the members of the committee that Congress must lay something down in the law to cover these troubles, and not draw the bills in generalities. They have to be specific enough to prescribe what is to be done, and then it will be done.

Mr. HULL. I do not agree with you on that. There are not generalities in the bill I have drawn.

Maj. FOULOIS. It does not go far enough; you need to provide for the money and the men in there.

Mr. HULL. The money is provided for in there. As I look at it I do not see how you can take the personnel of the Army out from under the General Staff. That is a point you and I do not agree on.

Maj. FOULOIS. I feel that we could take them out in time of peace without question. We can operate this thing. I would be perfectly willing to go into this department or stay in the Army and work on that end of it. I would be perfectly willing to take officers and men out of the Army to put in that department and run it with the knowledge that we would be developing something that would be of benefit in time of peace and be used as a military asset in time of war. Quite a number of us have been through the Army schools and staff colleges and have kept up our military education, and we would be able to combine with our military knowledge something that practically all General Staff officers lack; that is, practical experience in aviation. That is why we can do a great many things which they do not give us credit for.

Mr. OLNEY. Despite the feeling of disgust prevailing in the Air Service, do you anticipate any difficulty in getting volunteers in the aviation service, provided you get sufficient money and provided the policy is adopted which you desire to have adopted.

Maj. FOULOIS. You mean volunteers to come into the service to-day?

Mr. OLNEY. If you get the policy you want and have a separate Air Service and get separate appropriations, would there be sufficient inducement for men to volunteer to go into the aviation service?

Maj. FOULOIS. I think so; I think there would be no difficulty.

Mr. OLNEY. You have had indications of a willingness to serve?

Maj. FOULOIS. Yes; but the longer it is delayed the harder it is going to be to get them. There are a great many men now whom you could probably get who would come in. A part of my testimony before the Committee on Military Affairs on the matter of Army reorganization was published in the Air Service magazines, and I have been hearing comments from every section of the country on the question. Men would come in if they saw some future for them, but the longer they stay out the harder it is going to be to get them in. They are not going to come back. Once they are settled in civil life you can not get them back except in time of war, and there would have to be a bigger war than you might have with Mexico in my opinion.

Mr. HULL. You say they are not placed in reserve?

Mr. LAGUARDIA. I do not think 5 per cent of my boys took reserve commissions.

Mr. HULL. Would not this be practical: If we had plenty of flying fields, where we kept the necessary equipment, and if the reserve officers could go to the flying fields and engage in flying, would they not stay in the reserve?

Maj. FOULOIS. I do not think there is any question about it, if we could get underway and get some civil development. We should develop aviation to make it a civil and commercial asset to the United States. That is the only thing which will develop national

aviation. That carries with it the development of fields and the development of land places wherever you need them. Every community throughout the United States is interested in aviation and they will help to get it going.

Mr. HULL. And these flyers might have to fly at some of these fields a few times every year to stay in the reserve.

Maj. FOULOIS. That would be worked out in any policy that was adopted as a national policy of the United States. That would readily work out in a national military policy which might be adopted.

Mr. HULL. How long would a flyer be of much account to do real flying?

Maj. FOULOIS. I have been at it 11 years, and I do not consider myself an exception.

Mr. HULL. I mean if he was in the reserve and did not do any flying at all?

Maj. FOULOIS. It would depend a good deal on the type of work you put him on. If you want a man to do pursuit flying he ought to have quite a little practice on that. But the thing is going to keep on developing and growing, so a man of that kind is going to have a great many opportunities to fly.

Mr. HULL. If we had fields at central points throughout the country so that reserve officers could go there and do a little flying during the year, practically all of them would do that?

Maj. FOULOIS. I think they would, without doubt.

Mr. HULL. And it would bring a lot of them back into the service who are at present out of the service?

Maj. FOULOIS. They could be carried as active or inactive reserve men. I believe in the idea of developing our citizen army, which we must always count on, and there is no reason why we could not provide for our aviators and mechanics in the same way. We would develop and train men in civil life for military service.

Mr. HULL. Have you ever studied this problem? In case we do adopt a system of universal military training, we will probably adopt some form of a citizen army, either the National Guard, or something along that line. How would you connect up the flying end of the game with that?

Maj. FOULOIS. It can be done in a perfectly logical way. I do not see any difficulty about it. Whatever general policy might be laid down you could very readily apply the aviation end to it without any difficulty. It is a question of training. My own idea in connection with these forestry men and the Post Office Department, and men in the other branches of the Government using aviation is that it would be infinitely cheaper to put every one of those men in a national reserve and keep them on active duty, and I am sure the figures on the comparative expense will bear out that statement. It will be cheaper than operating those machines by civilian mechanics and fliers. Then you would also have them under military discipline, and you would have a military organization.

At the present time one of the weaknesses of all the civil departments of the Government is that they have not sufficient organization to develop it very far. If they organize and expand they would have to have a very elaborate organization. If they have an organi-

zation and have units like our own units, which would fit in, such as squadrons, and if they have a semi-military organization it would be cheaper and more efficient. We would not have strikes very often.

Mr. HULL. I take it you are fairly well acquainted with the Dayton field?

Maj. FOULOIS. There are several of them. I have not seen any of them since they were built.

Mr. LAGUARDIA. Has the General Staff had the advantage of the services of a real flying officer during the last ten years, on very many occasions?

Maj. FOULOIS. During the last 10 years?

Mr. LAGUARDIA. Yes.

Maj. FOULOIS. Very few. We were all in the service all the time.

Mr. LAGUARDIA. Assigned to the General Staff?

Maj. FOULOIS. Assigned to the General Staff? No; I do not think there has been a flying officer assigned to the General Staff. Some flying officers have been attached to the General Staff occasionally. The first Air Service flying officers attached to the General Staff were attached for General Staff duty in the American Expeditionary Forces.

Mr. LAGUARDIA. I mean on this side.

Maj. FOULOIS. On this side? I do not think so. They are not assigned to the General Staff now. We have several Air Service officers on duty in the Army General Staff College, but they are on duty as students.

Mr. LAGUARDIA. That was my information.

Maj. FOULOIS. They are not on duty as General Staff officers. I do not think we have ever had a flying officer on duty as a General Staff officer.

STATEMENT OF LIEUT. COL. H. M. HICKAM, AIR SERVICE.

Mr. LAGUARDIA. What is your name and rank?

Col. HICKAM. H. M. Hickam, lieutenant colonel, Air Service.

Mr. LAGUARDIA. What are your duties?

Col. HICKAM. I am chief of the information office of the Director of the Air Service.

Mr. LAGUARDIA. How long have you been in the Air Service?

Col. HICKAM. A little over 15 years.

Mr. LAGUARDIA. Are you a Regular Army officer?

Col. HICKAM. Yes.

Mr. LAGUARDIA. We would like to have your statement in regard to this matter.

Col. HICKAM. It seems to me, Mr. Chairman, from reading the testimony, and also taking into consideration a great many of the reports I have seen from various countries, that there has been altogether too much talk about what the Army and Navy are going to do in the development of aviation.

To go back a little bit and to lead up to some of the points I want to bring out later, I would like to say this. I found from an examination of the reports from South America that British, French, and Italian interests are trying to push commercial aeronautics there, and in trying to find out what they did I recon-

structed the policy which I afterwards found out by consultation with Gen. Charlton to be correct, and that was that early in 1917 the British Government realized that it would be necessary to take some very drastic steps in connection with their industry. From the statistics which we have been able to compile and from estimates we are able to make, aircraft is used up in war about 10 times as fast as in peace. Assuming that an industry, by working holidays and working a 24-hour shift, is able to double its capacity in a short time, which means that we have to provide an industry five times as big in peace as we are going to need, and that means that we have either got to take a chance of being unprepared to go in the air or we have got to do one of two things, and that is make the commercial interests of the country pay for the industry, or support it by taxation.

The thing is such a tremendously expensive thing that it is utterly impossible to support it by taxation.

In examining into the commercial possibilities of aircraft it is readily seen that what aeronautics has to sell to business includes the elements of time and convenience, which work together. The thing which a great many of us in this country have failed to take into consideration is the fact that we have a great railroad system and a good-roads system and a good communication system already built up. There are other parts of the world that have wondrous business possibilities which have not those transportation facilities. For purposes of comparison, so you can get a little insight into the commercial uses of aircraft, we can take a 500-mile journey by airplane and compare with the other modes of transportation. It is possible to make that, on the average, in five or six hours—say six hours. On a railroad that would take probably 24 hours, and with a high-powered automobile, over excellent roads, where good speed is possible, it could probably be made in 24 hours. But with Ford machines and trucks over average roads it would probably take two or three days. Then we come to the thing we have not considered, and that is that we have nothing but a horse and buggy, and in that case it will take from 20 to 60 days, depending upon the kind of country you travel over.

It is readily apparent that where there are great business possibilities and no transportation facilities, your aircraft become immediately your most economical method of transportation and communication. Those conditions apply in Mexico, in South America, in China, and in other parts of the Orient.

It became immediately that the best chance to develop commercial aeronautics would be in those countries, and so Great Britain, France, and a little late, Italy, almost from the start realized that it would be necessary to develop their industry in those places, and they immediately went at it.

There is another consideration that enters there and that is that if aeronautics is to be a success in time of war when you have to have increased production, and at the same time you withdraw from it a considerable number of your most efficient producers, it will be absolutely impossible to take from the business interests of the country this method of transportation. If commercial aeronautics is to be a success we have to continue in war just as we do in peace.

If the industry is devoted to making large airplanes in time of peace for commercial domestic use, you have to keep that up in time of war and possibly help it out. But if a portion of your industry is devoted to making aircraft for other countries you can stop that and devote your entire industry to the manufacture of planes for national defense, without disrupting the situation in the industry, and that is another reason why those countries have gone into South America, and it is one reason why Germany is preparing to do so.

I pointed this out to Mr. Bradley, of the Aircraft Manufacturers' Association. He recognized it immediately, and after making some plans and looking into the possibilities, he decided he could not get the backing of his people to do it. They were afraid to take a chance on it because of liquidation. He also realizes that while the Curtiss Co. might go into South America and compete with the Handley-Paige Co., it could not compete with France or Italy, and therefore we must have governmental support and backing.

At that time I did not take any further steps in the matter of help, except to promise that I would do individually what I could. I began to look about for some other opening for them, and immediately China and Manchuria and Siberia seemed to offer the best opening.

In seeking an excuse to get this before the State Department, I went up with the representative of the Netherlands to get the State Department to consent to ask Congress for an appropriation to enable us to be represented in an aeronautical exposition to be held in the summer, and they very properly asked me why I wanted to pass the buck to the State Department, and why they were interested in the development of commercial aeronautics. I outlined to them what I have outlined to you gentlemen, and they immediately saw where the State Department was very likely to be concerned in it.

I also went to the Department of Commerce, and as the result of a lot of reports they had received from their representatives in South America and some of the representations we made to them we had an informal meeting at the State Department at which Dr. Manning and Mr. Gargoyne, of the Commerce Department, were present, and we talked over the advisability of getting an aeronautical trade commission in those countries, taking advantage of the opportunity that lay there to develop our industry.

After examining into all the possibilities we found no governmental function which had authority to do it, and they did not have the money. We thought at that time that possibly a bill providing for the creation of a department of aeronautics would go through within a reasonable time, and we decided to wait until something developed. We were simply talking over the situation, but I kept my eye on China.

Very recently I received a report which indicates that the British Government has sold to the Chinese Government—after loaning them the money with which to purchase it—about $43,000,000 worth of aeronautical equipment. We are attempting to develop our foreign trade in China and attempting to develop our other foreign trade. I understand we are getting ready to spend millions of dollars in the Orient. While we wait for the development of aeronautics we allow the British to go into China and put in a communication and

transportation system embracing their most important commercial centers, and thus allow them to make a business survey and get their men in control of the Chinese business interests, and at the same time they build up a tremendous industry at home for national defense. Those are some of the consequences of our delay in getting started a department of aeronautics and getting it on a proper basis.

I would hesitate to say that there is a tremendous commercial possibility for aircraft, but I can not see how it can be otherwise. Aircraft is following exactly the same law as every other improvement in transportation, and I suppose the same conditions that apply to aircraft applied to the wild animal that the first aborigine harnessed up to a wagon.

Mr. LaGuardia. I would like to ask you one question right there. You told us about England getting planes into China, and aeronautical equipment. Do you know anything about the British getting planes into the United States?

Col. Hickam. I will take that up later, if you do not mind. The development of steamships is exactly parallel to the development of aircraft in commerce. The railroads fought the same fight; the automobile has fought the same fight; and the same conditions are presented in the case of aeronautics, except that in this thing we have at last solved the problem of getting off the earth and moving around without having to depend very largely on what is underneath. Aircraft can compete on its own line with every other known form of transportation, from ocean going steamers to the pack mule climbing over the mountain trail. It looks to me as a result of the war that there has been enough developed in it to put this method of transportation on a sound financial basis almost from the beginning. I do not mean that we should take the war planes and find a commercial use for them. That is what nearly every country has done. This is a transportation problem, and transportation problems should go to transportation men. They should make a survey of this country, and every other country where we can find a use for aviation, and find out where we can make the best and most efficient use for aircraft, so that we can go ahead and develop what we need. Then we should develop what we need and put this into effect immediately. That requires a department devoted entirely to that business, a department which will take advantage of the facilities which the Government now has.

We have a very excellent Weather Bureau, but it is not adequate at present for getting weather reports for the use of commercial aeronautics. But they are interested, and they have a lot of that sort of knowledge, and all they need is help in getting the aeronautical knowledge that we want.

We have good maps, but if we get a department of aeronautics we can chart the airways. We have good telegraph and telephone facilities and a good wireless system, and we can get the communication we want. There is not a town in this country that is not willing to set aside, at their own expense, and maintain in a small way a municipal landing field, if they know what to do now—what branch of the Government to go to to get some backing.

It seems to me we should have a department of aeronautics to take care of these other problems that have come up. The world is mov-

ing very fast, and within the last 18 months the development of the science of aeronautics has speeded up the whole world, and we can not afford to be left behind.

Also, in that connection I am continually receiving reports and having conferences with Gen. Charleton about the development of aeronautics in the United States. There is a wonderful business possibility here, and if it is finally proved to be a success we are going to find ourselves in the same condition in respect to aerial transportation as we did with ships. England will be very glad to put in our commercial line for us, because that would enable England to build up an industry at home which she can devote to national defense, and then let the business suffer. It is much better for her to do that than to develop her own aeronautics. That is because of the fact that she can use her own industry to make planes for national defense.

It is only very recently that the War Department and the Navy Department have admitted the necessity for a department of aeronautics. They have all desired to develop the air service which they need for their own purposes.

As Gen. Foulois has pointed out to you, there are two general uses of aircraft in the Army from the military point of view—one which is purely air service work, and the other which has to do with the operation of the work on the ground. I go further than Gen. Foulois and say it extends very much farther in its possibilities than the mere observation work for artillery or reconnaissance for divisions, corps, or army headquarters. To show the possibilities in this we are now working in the Army on a proposition which is going to solve the tank problem. Most of the casualties in the Tank Corps came about from the fact that the men had to run back and forth between tanks in order to keep up their liaison. It is now possible to communicate by telephone from a tank to an airplane, and it is almost as efficient as the service you have sitting at your desk in your office. That makes it necessary for the tank officer to get into the air.

The advent of aeronautics in warfare has had a wonderful influence on tactics and on strategy. That makes it necessary for a commanding officer of a division of Infantry or Artillery or of the other special branches of the service to get into the air to see what is going on. It is going to mean that the Army is going to need an increasing number of airplanes, and the General Staff has just begun to realize that the size they have allotted for an army of 250,000 is not going to be sufficient for their own needs. There is no question but that the Army needs airplanes of a certain type and needs pilots with certain training to do the work of the Army. Whether they develop that for themselves or whether some other department develops it for them is a matter of administrative economy upon which I am not competent to advise you. That is the problem.

When it comes to aerial combat, to bombing, and that sort of work, that is where it is very difficult to draw the line, but I should say they should be under the Air Service. I may be all wrong about this, but these are conclusions I have reached after devoting a great deal of study to it.

There is no question but what we failed to have the best possible morale in the Air Service both overseas and also in training here; I

think you will bear me out in that. In looking into the reasons and in talking to a number of flyers and to other Army officers I think I have arrived at the reason why there is a lack of understanding of air-service needs in the Army, and that is that the Army air service was run on a different psychological principle, and it is impossible for a man trained purely in one branch to understand the attitude of mind of the man trained purely in the other. The military system is built up as the combined result of human experience, and it does not make any difference what we think about it, those principles are there; but when we get into warfare the veneer slips off pretty easily and you have to deal with the human animal in the rough, and the military system of laws and procedure is designed only to enable the individual to do his military duties with other individuals under conditions where the average human being does not function at all.

To do that we have built up an institution such as our commissioned personnel, but we have to build up around that commissioned personnel a prestige which will enable them to do their duty, because it is necessary in order to lead men in battle that those men have a confidence in and respect for their officers that those officers can not have in and for themselves. But it has got to go beyond the human personal relations of two men, and the officer has to build up a lot of prestige. That does not apply in the same way to the Air Service as it does in the rest of the Army. The pilot goes out and does his military duty with the machine. One must be a pilot to realize what influence a pilot is, and a man who is not or has not been a pilot can not understand it. For that reason the same laws do not apply to one problem as to the other. In going forward in attack, the very sacredness of the human body is a thing that is taken into consideration. But we have built up in the other military branches a feeling where a man is willing to sacrifice himself absolutely to carry out the orders of his superior. In the Air Service we have to build up the qualities of the man which make for absolute confidence in himself, dependent upon himself and no one else, and when you take a lot of high-strung youngsters and put them through that course we are likely to develop a feeling of self-sufficiency in them that makes them very obnoxious to men trained under a different system.

I have had officers of other lines of the service say to me if they could get hold of pilots they would get discipline in them in a few minutes. But they could not do it. A great many of the officers came into the Air Service from the rest of the Army, and we are responsible for the discipline and the morale of the Air Service, and if we could not do that, it stands to reason the rest of the Army can not do it. I do not blame the General Staff; I do not blame anybody, because it is a thing you have to go through in order to realize what it is.

But there has been a decided lack of knowledge on the part of the War Department of the methods of building up morale in the Air Service. Because of that lack of understanding some things were done which infuriated the fliers, and that brought about a lot of hard feelings which reacted on the General Staff, and as a consequence we have not had the confidence of the General Staff, and they have not had our confidence; and a great deal of the trouble has

come about from the fact that we do not talk the same language, and so we can not get together with them.

For that reason it is going to be rather difficult for the Army to build up itself that air service which it needs for its own purposes, to say nothing of the larger questions in connection with an independent air force, which is run on a different psychological principle. It is necessary to build up in time of peace two industries, one which will turn out planes that are necessary and one to turn out pilots to operate those planes. The smaller they are the more highly organized they must be if we are going to get anything out of them. I am not competent to advise this committee how to bring that about. I have seen these problems. I have studied them, and I think I see what is necessary to be done. As Mr. Hull says, it is easy to say just what should be done, but it is very difficult to tell just how to accomplish that. I must confess that I probably could not give you any very valuable ideas as to how to carry it out.

Mr. LaGuardia. What progress, if any, has England made in the preparation for the exportation of planes to this country?

Col. Hickam. Very little. They have a number of sales agencies in the United States, but I am not sure whether they have sold any planes or not. They came over here and started—they thought they were going to open up possibilities for a lot of business; but the first thing they ran up against was our patent laws, and they have not gone any further. I had some conversation with Gen. Charleton with reference to a request from a firm in Great Britain that wanted to come here and do business, and I advised him—and he agreed with me—that they had no show under the present patent laws.

Mr. LaGuardia. There is nothing to prevent them from taking out letters patent in this country.

Col. Hickam. Not a bit.

Mr. LaGuardia. Have you heard anything of a consignment of 300 machines being shipped?

Col. Hickam. I have heard of it, but I have not found it. My department has been conducting an investigation of the records of Mr. Frear's subcommittee to get data which has been developed there and I shall be very glad to make available to this subcommittee the results of that investigation.

Mr. Hull. You spoke of patents. Are there any patents, and, if so, what are they, on the airplane that would prevent such manufacture?

Col. Hickam. I think there are certain basic patents in this country, and British firms or other outside firms would have to purchase American rights to manufacture in this country.

Mr. Hull. What are those patents?

Col. Hickam. I am unable to tell you.

Mr. LaGuardia. On the warping of the wings, and the general control system. Our court went very far on that.

Mr. Hull. Those are in court now?

Mr. LaGuardia. Those are adjudicated, in regard to the warping of the wings and the lateral control. The court went very far in extending that basic principle to one of the litigants.

Mr. Hull. Colonel, you handle intelligent matters for the Air Service?

Col. HICKAM. Yes, sir.

Mr. HULL. Did you have any trouble in getting information in regard to the condition of the Air Service in Mexico?

Col. HICKAM. No, sir; I have not had any. We have not gotten very much knowledge from Mexico because there is not much to get from there.

Mr. HULL. You know practically what they have got?

Col. HICKAM. Yes, sir.

Mr. HULL. You have known right along?

Col. HICKAM. Yes.

Mr. HULL. There was no reason why your department should have had the least bit of trouble in obtaining that information from the Military Intelligence Department of the Army?

Col. HICKAM. Not a bit. The Military Intelligence Department has worked with my department very loyally; they have come to us for advice, and they have done everything they possibly could to help. I will say, however, that the most valuable report we have on Mexican aviation came from one of our own officers, who was invited to Juarez by Capt. Martinez, who had command of their air force.

Mr. LAGUARDIA. I judge from what you say that you have not any well-defined idea as to how far we should go with an independent air service in its relation to the Army and Navy beyond the matter of production and research engineering.

Col. HICKAM. I have a pretty good idea, but I think Gen. Foulois has expressed it very well. I do not agree with him on everything. I think the Army must have under its immediate control in peace and in war those plans which it needs in its business.

Mr. LAGUARDIA. But you would have the officers in the Air Service under the Air Service?

Col. HICKAM. Absolutely; it is run on different principles.

Mr. HULL. That brings up the same old question. How would you operate; keep the Air Service separate from the Army?

Col. HICKAM. Mr. Hull, there is only one solution to that, and we are going to come to it sooner or later, and that is a department of defense, which will have a War Department, a Navy Department, a department of air, and possibly a civilian department or bureau to handle the industries.

Mr. HULL. That is what we supposed we had in the General Staff. It would be practically impossible for Mexico, under present conditions down there, to have any comprehensive development of an air service without your knowing it?

Col. HICKAM. No, sir. We have been trying to find a trace of one foreign plane. If we can do that there is some indication of trouble there. I know Mexico has endeavored to purchase planes in the United States from British interests, and I know they have tried to get them there and also in Spain, but they have not had much luck there. I also know that Germany is prepared to send aviators into Mexico. The German interests in Mexico have increased tremendously in the last few months. They purchased all they could find in Mexico in 1915 and 1916, and I have information which leads me to believe that they intend to tie their business interests together with the air service, and if it goes on we are likely to find out that it would be something we would have to take into consideration. But that, of course, is in the future.

Mr. LaGuardia. You were in France?

Col. Hickam. I was not.

Col. Hickam. The General Staff is an Army General Staff. This Department of Defense has got to coordinate the Army, the Navy, the Air Service and industry as well. The time when you go to war with a squirrel rifle has gone. We all know that modern warfare demands the coordination of every phase of human activity.

Mr. Hull. Let us take a concrete case. Suppose your idea was in working operation and you were fighting in France, say, in the Argonne Forest; your airplanes would be operated by a commanding general who would not be under Gen. Pershing, but would be outside of his command; is that your idea?

Col. Hickam. What airplanes do you mean?

Mr. Hull. Some of them.

Col. Hickam. Yes, sir.

Mr. Hull. You would have airplanes operated on the front that would not be under the control of the General Staff of the commander in chief; is that true?

Col. Hickam. No, sir; all military operations have to be under one head; there has to be unity of command.

Mr. Hull. That is what I thought.

Col. Hicham. But we have an illustration, where the Marine Corps cooperated very successfully with the Army, under the command of the Army, and with your separate Air Service the Army commander would have the right to demand a certain area of protection, but he would not have a right to demand that certain ground troops shall be attacked from the air. But he could go to the proper authority to get those things done, but he should receive the advice of that man in command of the air forces as to the possibilities and limitations.

Mr. Hull. If you take the Marine Corps as an analogy, the Marine Corps when it operates with the Army, operates as an auxiliary force, and also when it operates with the Navy. It operates between the two, and that is all right; but that is not an analogous case. You can not get an exact analogy.

Col. Hickam. No.

Mr. Hull. You have none?

Col. Hickam. There are some analogies——

Mr. Hull (interposing). Oh, yes; but there is no true analogy for the Air Service.

Col. Hickam. It is something which has to be worked out. We have to take advantage of our past experience, but we are not doing that.

Mr. Hull. My thought is that you have got to step carefully and not try to step too far, because if you step too far you will get into the mire.

Col. Hickam. That is true.

Mr. Hull. If you step carefully and go along on safe ground, you will go forward a good deal faster than if you jump into the swamp and get lost.

Col. Hickam. That is true; but we have enough knowledge to demonstrate the necessity for certain things. We have delayed too long on that already, and the air industry is almost dead. It can not

be built up in a day. We could not get planes for Mexico under 12 months, and I doubt if we could get them under 15 months. The proposition is this: It is like raising wheat; it does not make any difference how many acres you plant, you do not get your crop any quicker.

Mr. HULL. That is a very interesting statement, if it is true.

Col. HICKAM. That is true.

Mr. HULL. After spending all this money, you say you could not produce planes to go into Mexico inside of 12 months. Do you mean to say you could not take the Curtiss factory, with the North Elmwood plant, and start active production there again, with all the material to produce planes at hand and not be able to produce planes inside of 12 months?

Col. HICKAM. I very much doubt it.

Mr. LAGUARDIA. Especially if it is a new type of plane.

Col. HICKAM. If it is a new type of plane you can not do it.

Mr. HULL. You have the engines.

Col. HICKAM. I am talking about planes.

Mr. HULL. You have the material.

Col. HICKAM. We have the material. Mr. Coffin, when he had this tremendous proposition put up to him, looked over the situation and said that engine production is harder to build up than plane production, and thereby he demonstrated the utter ignorance, not of Mr. Coffin, but of the production people in the United States.

Mr. HULL. It was the utter ignorance of Mr. Coffin. There was not a member of the committee who did not question that proposition. There is no doubt about that.

Col. HICKAM. I do not know about that. But I do know there was not in this country the knowledge or experience to build up the industry in the United States.

Mr. HULL. It was the egotism of a man who thought he knew it all. The members of this committee knew that. He told us he did know it. He was told at the time that here was a great deal of question about that. He thought he knew it all.

Col. HICKAM. It certainly seems now that he did not.

Mr. HULL. He thought that the Members of Congress did not know anything.

Maj. FOULOIS. In regard to the question of the independent action of the air forces, a part of the British force operated independently, and a part of the French force operated under the orders of Marshal Foch. The French were one of the first to do that. They organized a division of aeronautics, organized entirely of pursuit and bombing planes. These, when they were used, were under the direct orders of Gen. Duval, who got his orders from the supreme command. The supreme command would tell him to report to Marshal Petain, or some other commander. This force would then be turned over to such a commander until the necessity for the service was over, and then they came back again and they were available for general operations all along the front. It did not require any general staff to handle that.

Mr. HULL. The supreme command had a general staff; they operated under the supreme command of the Army.

Maj. FOULOIS. That is exactly what will happen in the next war. But that does not interfere with the organization of a national air

force, which would not report, if we had a front 400 miles long, to any individual commander, but would be under the supreme command, and we would always have a supreme command where one or more nations are allied together for war.

If we are going to have an efficient national military organization there are three elements to consider, one the Army, another the Navy, and the third the air, and there has to be something besides an Army general staff to operate that.

Mr. HULL. But the supreme command, as far as the Army is concerned, is the general staff?

Maj. FOULOIS. But when you get away from the functions of the Army, you have to have something bigger than the Army general staff to operate the combined functions. That is what they had abroad when they had all the armies under one command. There was no allied general staff operating separately, but they were all coordinated under a supreme command. That is absolutely necessary, and will operate absolutely efficiently in time of war conditions, if we organize that way in time of peace. The American Army should have its Army observation air troops, and such troops as it actually needs will be left with it at all times. But, as stated before, there is another aviation function that has not been touched by the military people, and that is the offensive use of it, the bombing and fighting end, which does not necessarily need to be trained with the Army. They could train entirely differently, but do not need to be put under some Army or Navy organization, except when assigned to Army or Navy duty.

Mr. HULL. It has to be under the supreme command?

Maj. FOULOIS. Exactly.

Mr. HULL. And that supreme command has got to be really a general staff?

Maj. FOULOIS. Exactly.

Mr. HULL. You can call it what you will, but it is the General Staff.

Col. HICKAM. Not the General Staff of the Army.

Mr. HULL. If you want to go into that refinement of it, it is in the final analysis, the President of the United States.

Col. HICKAM. He should have under him a general staff which represents the Air, the Navy, and the Army, and the Army General Staff is no more competent to handle a separate Air Service, fighting, than is the Navy.

Mr. HULL. I will call your attention to this fact, that if you try to create a general staff to handle the Air Service, you might as well stop now.

Maj. FOULOIS. We do not want to do that. What I want to see developed is an organization built up that will develop the industry in the United States, that will train men to be used in time of war, either with the Army or the Navy, or which will be able to go on independent missions of its own.

Mr. HULL. I think that far every member of the committee will go with you.

Maj. FOULOIS. I would eliminate the term "General Staff" from our aviation problem entirely, and then you can call it anything you please. You can call it a supreme war council, if you like.

There was, as you know, a supreme war council. On that I served as the aviation representative with the American section. When we used the term "General Staff"—I would like to see it eliminated when we refer to the higher command. It is composed of a body of men who know all about their own particular speciality and also what the other fellows need. That is the reverse of our present organization.

Mr. HULL. We have a Council of National Defense.

Maj. FOULOIS. That is analogous to or a counterpart of the Supreme War Council in France.

Mr. HULL. But the minute you get these fellows trained to do duty on the line of the Army or the Navy they have to operate under the General Staff that is directing the operations against the enemy.

Maj. FOULOIS. That is exactly what is contemplated in Senator New's bill and in Mr. Curry's bill, the men who operate with the Army belong to the Army, and the men who do not operate with the Army do not belong to it.

Mr. HULL. If you agree with that, then there is no argument. Once in a while somebody contends that you are going to have an independent command.

Maj. FOULOIS. Yes. Under some supreme command.

Mr. LAGUARDIA. The Marines, who were absolutely under the Army in the operations in France, belonged to the Navy. So will the Air Force be under the command of an Army man for that purpose. But it was not the commander of the Marines who controlled the ships on the sea. It is not exactly analogous.

Mr. HULL. The Marines are not analogous to the Air Service.

Mr. LAGUARDIA. They were Navy personnel turned over to the Army, who fought under the command of the Army, but the ships remained under the command of the Navy. They were on the water. When we turn over the air squadrons for observation they are working with the Army and they are under the Army commander. But aside from that, there is an air force making it possible for the others to function, because if you have not got a superior force in the air your Army can not function.

Mr. HULL. Then the man in the air is operating under the commander of the Army on the ground. He must, as I see it. Gen. Pershing and his General Staff in France would have control of the air forces in France?

Maj. FOULOIS. In his sector only.

Mr. HULL. He controlled all his sectors.

Maj. FOULOIS. He had a certain front which was assigned to the American Expeditionary Forces, and he controlled nothing outside of that on the front. The best illustration I can think of was the French Division of Aeronautical troops taken out of the various French armies. They took from three or four different French armies a certain proportion of pursuit air squadron and bombing air squadrons and put them under a French general, who took his orders from the supreme command, and that is what happened with the British. We should have a supreme command in times of peace as we would in time of war. Under the American general there would be a certain amount of air troops. If we held the whole front the whole thing would be turned over to him. That is

what would happen in any war, and if there was another nation involved and our operations extended into its territory, then you would still require one supreme command. That supreme command would probably organize a reserve force and operate in the air, either on the American or some other sector.

Mr. HULL. I want to ask one question in regard to the pilots in France, which was brought out yesterday. Were there plenty of pilots over there?

Maj. FOULOIS. No, sir; not toward the end. We were short of pilots, according to my recollection.

Col. HICKAM. And of enlisted men, too. I had the concentration camp at Garden City, and I had to push them along, 150 or 350 at a time.

Mr. LAGUARDIA. After the priority order went into effect we could only send Infantry troops across?

Col. HICKAM. I got them across, anyway. I organized the outfit and got the men on the boats, and organized them after they got on the boat, when they could not catch the boat from Camp Merritt.

Mr. LAGUARDIA. And we had 10,000 or more of them in England.

Mr. HULL. Suppose we provide for an Army of 250,000 men, how many men do you think the Air Service ought to have out of that 250,000?

Maj. FOULOIS. I have not gone into the question of general details of organization on the basis of an Army of 250,000 men. It depends entirely on the nature of your operations.

Mr. HULL. Under the present circumstances, if we provide for an Army of 250,000 men, all told—and I am simply putting that as a hypothetical question—that is what we are talking about; how many of those men should be Air Service men?

Maj. FOULOIS. Under existing conditions, with the possibility always of having to settle the disturbance south of us, I should say 50,000 men.

Col. HICKAM. It does not make any difference whether the Army is composed of 250,000 or 500,000.

Mr. OLNEY. Mr. Hull has in mind, I think, what the proportion of the Air Service should be to the whole Army.

Maj. FOULOIS. You have to have some reasons for it, in figuring on the proportion. I agree with the normal way of figuring the proportion of the air force for an army, purely because the normal military vision only sees the observation side of the question, and that is based normally on what we call one squadron per division. If you use an army of 250,000 men in divisions, you are not going to have many divisions. But you have to figure on the possible uses for that army outside of normal peace conditions, and you have to have some basis for expanding that in case of war.

If we went into operations in Mexico the uses of the Air Service would be greatly expanded, as compared to what they were in France. It would be an entirely different situation. You would use more air troops in proportion to ground troops than would ever have been the case in Europe.

You have to base your military policy on your respective needs. If we went in Mexico to-day or a year from now, the biggest asset of the occupying troops would be the Air Service. Gen. Pershing

said when our troops were down there before that one airplane was worth more than a regiment of cavalry because we could cover miles of territory, and we could cover territory in an hour which would take a regiment of cavalry a week. But that is a country which lacks communications such as telegraph and telephone lines and facilities for transportation. The Air Service would be used all over that country.

Mr. HULL. You speak of a separate Air Service. Would you include in that the balloon service?

Maj. FOULOIS. To a certain extent, yes, sir. The dirigible end of it particularly.

Mr. HULL. You would take over all balloons, practically?

Maj. FOULOIS. Yes.

Mr. LAGUARDIA. In figuring your estimates for an Air Service, naturally that would include everything, the Army, the Navy, and the Post Office, carrying on all these various civil activities, without increasing the troops, is that not correct?

Col. HICKAM. I was figuring primarily on the Army needs, especially.

Mr. LAGUARDIA. But in time of peace that same force could be utilized in these other activities, so it would not be so out of proportion if we stopped to figure that that would release so many men from the Army and the Navy and would take over these other activities?

Maj. FOULOIS. It would furnish personnel and train our reserves for the Army, the Navy, the Post Office Department or other civil departments. It would furnish personnel to train in time of peace for what is the most important thing in time of war, and that is the Service of Supply, a training which has never been efficiently done in the history of the United States Army by and branch of the Army. The only thing we have ever figured on to my knowledge is the actual standing troops in the Air Service, although 90 per cent of the work is on the ground and 10 per cent in the air. A great deal of the ground work is underestimated. You can not operate the air troops simply as combat troops on the fighting line. You have to figure on the material necessary to keep them up, a problem which is more difficult in the Air Service than in any other branch, and you have to train men for such service in time of peace as well as for the fighting end. Much of this ground service is underestimated in the present organization to-day.

Mr. LAGUARDIA. But in time of peace you can utilize them?

Maj. FOULOIS. Yes.

Col. HICKAM. It is very much better to take a military trained flier and put him into the civilian aeronautics than to depend upon civilian fliers in time of war and have to train them for war purposes. If you train those men on the military end and put them into the civilian work, you have trained men there ready for work in war time. France is paying 10,000 francs a year for every pilot flying in France, and they would have the use of such men in time of war.

Mr. OLNEY. Our fliers are fairly well compensated, are they not—sufficiently well compensated to induce them to come into the service?

Col. HICKAM. Another thing we have to realize is that you can not take a man into the service and keep him in all the time and do like you do in the Army, because after awhile the great period of

usefulness is gone, and we do not know how long that will last. It may be 10 years. The medical information that we have indicates that the age from 21 to 31 years is the most favorable period for flying; after that, while a man is still competent to fly, you have no place for him in the military establishment. So it means that our first or second lieutenants have to be men who will come in and go out all the time.

Mr. HULL. I agree with you in regard to the desirability of a man being young in order to fly successfully. But we had a most amazing statement the other day. One of the officers of the Air Service said that a flier would last and be good as a flier up to the time when he was 60 years old.

Maj. FOULOIS. I have discussed with medical men to a considerable extent, along this articular line. When they speak about flying they speak about the man who actually pilots the machine. There is a lot of other work involved. You have the man who does the observing, who rides as an assistant, who is also valuable to the aeronautical end of it, who goes into the executive, administrative end of the thing, who does the ground work, looks after the shops and depots, and things of that sort. Those men as they grow in experience are more valuable to the development of the work than they would be in the air.

But as this work expands you are going to find plenty of room for the next 15 or 20 years for the older men, if they are worth anything at all. Even in the service to-day the older a man grows the more responsibility is put on him. He gradually goes from spending all of his time in the air to spending the greater portion of the time on the ground. He is more valuable in commanding flying troops because the youngsters look on him with respect. There is plenty of chance for a great many of the older men.

Mr. OLNEY. How would the General Staff feel about your recommendation for an Air Service of 50,000 men, if Congress should decide to have the Army which the General Staff bill provides for, of 509,000 men?

Mr. LAGUARDIA. They would not all come under that. There would be the Navy, too. About how many would they give us with an Army of 250,000 men, 13,000?

Mr. OLNEY. They might.

Mr. LAGUARDIA. On a basis of 250,000 men, what would they allow?

Mr. HULL. About 15,000, I suppose.

Mr. LAGUARDIA. That would leave them with 235,000 men for the rest of the Army.

Mr. HULL. As I understand Maj. Foulois, his idea is that there should be 50,000 Air Service men out of the 250,000 in the Army.

Mr. LAGUARDIA. Maj. Foulois would take 250,000 if we would give them to him, and we could not blame him a bit for that. That is one of the matters of detail. One thing is certain, that if this service ever is properly organized and is functioning properly, it would be producing properly.

Col. HICKAM. We can not afford not to have it. In the natural course of events, within 25 years aeronautics is going to be on a sound, paying commercial basis. If we go into it in the proper way,

we can make it pay in five years, and we will have the benefit of those other 20 years.

Mr. HULL. There is a very interesting question which I would like to have answered in regard to the possibility of the future commercial use of the airplane. You speak of the Post Office Department, and we will all agree that so far as we know at present, while it is a very nice thing to carry mail in the air, it is not an economical proposition. If you will study that proposition you will find this to be true, that it does not cost very much in the Post Office Department merely to carry the letters. It is the overhead that costs money there, and that is a fact that is very often lost sight of by everybody. Mail is carried by the carload to the terminal, according to the mileage. There is another thought in reference to the carrying of the mail that should be called attention to, and that is most of the mail is carried at night, and so far the airplane is not a success at night, is it?

Col. HICKAM. Not as yet; but there is no reason why it should not be.

Maj. FOULOIS. You can run your transcontinental trips at night. They have reduced the original cost on airplane from 26 cents an ounce, which it was about a year ago, to the regular postal rates to-day.

Mr. HULL. That reduction was not based on any facts or figures in reference to the cost?

Maj. FOULOIS. I am collecting figures on the actual cost now.

Mr. HULL. If they could run airplanes at night, it would be of greater value than in the daytime?

Maj. FOULOIS. There has been no necessity for it yet, and under their new plan there is no reason at all why they could not run between New York and Chicago by day and use their night planes for night runs for mail destined for points farther west. There is nothing to hinder the night use of aeroplanes for mail service, except lack of money, at the present time.

Mr. HULL. Of course, as a practical proposition 90 per cent of our mail is dropped into the receiving places between 3 and 6 o'clock in the afternoon. Everybody drops letters in the mail, or at least most of them are dropped in the mail about 4 o'clock in the afternoon, and where you have a day service and start the airplanes in the morning you do not get a great amount of important mail.

But there is also this thought. You spoke of transportation. Of course, that contemplates the transportation of people. Do you think people will travel by air?

Maj. FOULOIS. By air?

Mr. HULL. Yes.

Maj. FOULOIS. Yes; I think as soon as you can demonstrate the fact that it is safe enough to travel, they will travel that way, judging from the applications we get from people who want to fly.

Mr. HULL. Did you ever notice this fact, that very few men, practically, care to repeat very many times?

Maj. FOULOIS. Yes, and I think that is entirely due to the psychology of the thing. At the present time they feel that it is dangerous. I think there are a great many concerned in that feature more than anything else.

Mr. HULL. Why is it that practically every woman who flies wants to go up as many times as she gets a chance? Women do not seem to be afraid at all.

Maj. FOULOIS. That is a question I can not answer.

Mr. HULL. Even men who have been fliers, whom you would imagine are not afraid to go up in a flying machine, do not care to repeat their flying trips.

Maj. FOULOIS. I can give you a little illustration concerning my own experience. When I started, in the early days, one of the first lessons I was taught by Wilbur Wright was to take it easy. I used to get irritated because the machine was not ready to fly when I was ready to go up. He would say, "Get your mind off it, and adjust yourself to it gradually." It took me three years to learn to get up 3,000 feet, although I have known men who have done it in three weeks. But many of them have quit flying, or were killed, because they did not adjust themselves to the new mental attitude toward flying. It is just a question of getting used to the thing and making people realize that it is safe, and when you do that I think you will find plenty of people who will fly.

You will find hundreds of Army officers to-day who will say, "You could not get me up in that thing." We look upon an Army officer as a man who is ready to risk his life at any time. I have seen this happen on the field. I have known men who have told me they would not fly in a flying machine for a million dollars. They would sit around, however, watching the machines going in and out, and then by and by they would go up. It is just a question of getting people educated up to the fact that it is as safe as any other method of transportation, comparatively speaking, and when you do that I think you will find plenty of people ready to go.

Mr. MORIN. In addition to having the marines operate under the command of the Army, did they not also take charge of the naval guns which were operated on land, and man them with crews from the battleships, and were they not under the command of the Army on the battle fields?

Maj. FOULOIS. Yes, sir. I think they had some railroad artillery made up of large naval guns. I think they were operated by naval units under Army command.

Mr. MORIN. That is additional proof that these different elements can cooperate successfully under command of the Army in time of war, although they do belong to a separate department?

Maj. FOULOIS. Yes. The fundamental principle involved in this is that it is a specialty you have to build up and apply military uses to it. It is not a difficult job for the average civilian.

I will tell you what Gen. Duval told me. We took air observers who did not know anything about army life, who went through our schools, and inside of a month those men were operating on the French front as observers in French squadrons. Gen. Duval told me that those men were equal to the best men he had. I contend that in time of war we can do the same thing; we can develop aviation in time of peace from an aviation standpoint and apply the necessary principles to the aviators efficiently in time of war. That does not involve their being trained by the military all their lives, trained in time of peace for war. You can take the average Ameri-

can citizen to-day and give him his flying training give him his military training, and we can give him, inside of two months, all he needs to know in time of war to make him a competent military flier, after he has had training as a civilian flier. It is just the same as when you took the Navy men and took their guns off the ships and put them on mounts on the ground; they can operate them under military orders. We can do that same thing with these men just as well.

Mr. MORIN. During the tour of the members of the Military Committee in France last spring we were told of an incident when the Germans asked who those peculiarly-dressed men were at the guns. They were sailors. That shows that there is no danger in time of war, although the air force is under a separate department, that they can not cooperate successfully, under the command of the Army.

Maj. FOULOIS. They would do it mighty willingly. The necessity to-day is that the aviation side should be recognized rather than the military side. Ninety per cent of the airplane problem to-day is civil and commercial, and in order to make it a military asset in time of war you let 10 per cent dominate all the rest of it.

Mr. MORIN. How does the Navy feel about having a separate department?

Maj. FOULOIS. I do not know. I have talked with one or two naval officers, but I have no personal knowledge of what their sentiments are.

(Thereupon the subcommittee took a recess until 3 o'clock p. m.)

AFTER RECESS.

The subcommittee met pursuant to the recess at 3 o'clock p. m.

STATEMENT OF COL. E. LESTER JONES, SUPERINTENDENT COAST AND GEODETIC SURVEY.

Mr. LAGUARDIA. Col. Jones, you are the superintendent of the United States Coast and Geodetic Survey?

Col. JONES. Yes, sir.

Mr. LAGUARDIA. How long have you been the superintendent of the Coast and Geodetic Survey?

Col. JONES. Nearly five years.

Mr. LAGUARDIA. And prior to that time what were you doing, Col. Jones?

Col. JONES. I was Deputy Commissioner of Fisheries.

Mr. LAGUARDIA. Under what administration was that?

Col. JONES. That was under the last administration.

Mr. LAGUARDIA. It has been testified by several experts on aviation that aviation could be developed so as to be very useful to the Coast and Geodetic Survey work in this country. Can you give us any information along those lines?

Col. JONES. Mr. Chairman, to go back months, after some years of study in connection with aviation and its part in mapping our country, I realized that in special work in connection with our bureau they could render valuable service. The war necessarily stopped my

plan of procedure until this spring, when I took steps to put it into practical form, by offering a tangible plan to the Air Service, by which we could check up certain work which the airship could do, and thereby prove by comparison what value they would be in the future mapping of our coasts, the continental United States and our insular possessions. I am sorry to say that we have gotten very little cooperation. I want to qualify that very broad statement by saying that the spirit of cooperation was there; the officers I came in contact with, from the head down, were not only enthusiastic but ready to lend whatever effort was possible, but I realized their situation, in that they had not the personnel nor the paraphernalia with which to carry on this work. Therefore, I must say that up to this time our experiments have been almost nil.

I can see, without any question, where the airship can materially help in expediting, as well as save money, in certain mapping features of our country, and I mean continental United States as well as Alaska, the Philippines, and so forth.

To be specific, the Coast Survey is charged with the topographic work on our coast three miles from the coast line. The reason we have that part of the topography is because it is of great value and vast importance to the navigator who, coming into a port or approaching the open coast makes use of, on our navigation charts, the church steeples, wharves, and so forth, if he is off his course due to storm or fog. He can identify a church steeple or other object shown on the chart and immediately get his bearings. Now, unfortunately, due to lack of funds, the topography of our coast has not been kept up to date. We have the original topographic sheets, and an expert aerial photographer, a man thoroughly competent to go up in the air, with instructions from one of our engineers as to just what we want, could photograph the coastal areas.

From that photograph, even though the topography had changed materially in 10 or 20 or 50 years, we could detect on our original sheets enough unchanged features to enable us to correct the topography on our coastal charts, from the photographs thereby saving probably an expense to the Government of 50 per cent, as well as time equal to 50 per cent. It is a very practical, workable problem that only needs the cooperation of the two arms of the Government, backed up by funds. This is one of the big things that the Air Service can do in cooperation with the Coast and Geodetic Survey, which is to-day one of our crying needs.

Accurate charts are not only in connection with the Navy, the Coast Guard and the merchant marine, but it is invaluable to the Air Service itself to have these complete, topographic maps, and also to our coastal defenses in general. It is absolutely imperative.

As to the value of the airship in interior surveying. The primary control and our local triangulations, and for the detailed surveys, such as the Geological Survey produces, can not be done from the airship.

That must be done by instruments on the ground for the determination of of accurate latitudes and longitudes. That work is the foundation, and you have got to be absolutely accurate, and therefore you must be on the ground where you can make your observations, etc., and then mark the points for the surveys on land and

air. But I do see that the airship can be of immediate benefit by photographing the whole country, including Alaska and other of our insular possessions, thereby giving a temporary and general map, which is to-day very much needed. It is surprising, but still a fact, that only about 40 per cent of our country is properly mapped, and the demands on us and on other bureaus, I know, is enormous.

We work closely with other mapping bureaus. Our work does not overlap. I can see by the rise of the airship in importance in our commercial development that their assistance can materially aid the surveying organizations in furnishing to the country something that is very much needed, and that is a preliminary map. This map will be of immense value to the country in its commerce and industry, and it will be helpful in the completion of a permanent map of the country.

In Alaska, that wonderful frontier country that lies practically dormant to-day, just a crude map which can largely be developed by the use of the airship, will mean much in its development which otherwise might take years to bring about.

As to our hydrographic work, finding the shoals, finding the coral reefs, finding the rocks, finding the shallow waters in the coastal waters of the United States and insular possessions, which is very important and necessarily, in some ways, a very tedious job, again we feel the need of experimental work to see if we can locate the deep and shallow water, which we believe we can, at least in a measure, by getting aerial photographs that will indicate where there is a depth of water that needs dragging or other special attention, or whether the water is so deep, as indicated by its color, that it will not be necessary to have special attention by this detailed wire drag work.

Mr. LAGUARDIA. Col. Jones, how many machines, roughly speaking, could you make use of?

Col. JONES. You mean not only our revision of topographic work on our coast but for this general mapping scheme throughout the United States.

Mr. LAGUARDIA. And your hydrographic work.

Col. JONES. I should say a number of sections, each section includes a certain number of machines. That is a matter that I have not given serious attention to, because I have been totally opposed to various arms of the Government interfering with a function that does not belong to them, or does not help them in carrying out their work. I mean by that that nothing can be gained by coast and geodetic survey engineers going up in the air and taking these photographs, when we have at hand able men in the Air Service trained to take such photographs. It would just mean educating our men in aerial work who might not fully utilize such long and expensive education.

Mr. LAGUARDIA. So you are not going to ask us for an aviation department of your own.

Col. JONES. No, sir; I am absolutely opposed to such a thing.

Mr. LAGUARDIA. But you feel you could cooperate with a united Air Service.

Col. JONES. I am absolutely certain of it.

Mr. LAGUARDIA. You have been in the Air Service yourself?

Col. JONES. Yes, sir.

Mr. LAGUARDIA. How long?

Col. JONES. I was there a year, and I cooperated with the Air Service for about four years previous to that time.

Mr. LAGUARDIA. You have decided views on the subject.

Col. JONES. I have views, yes, sir, that might be accompanied by errors in judgment.

Mr. OLNEY. You have flown in the air?

Col. JONES. I have flown some, but I am not a professional flyer.

Mr. OLNEY. You have operated the machine?

Col. JONES. No, sir; I have flown in the air merely to understand the various planes and to observe conditions both from the angle of being able to express myself on photography in its relation to mapping the country, and then from the point of view of observing how certain planes act in the air, but I am not a flyer in the literal sense at all.

Mr. OLNEY. I am glad you spoke, and I am sure Maj. LaGuardia will appreciate it, of the value of the airplane to the Coast Survey, to locate conical shaped rocks which sometimes are near the coast, and which could be photographed and located from the air better than by these dragnets used by the ships.

Mr. LAGUARDIA. Which is slow and expensive?

Mr. OLNEY. Yes; which is slow and expensive.

Col. JONES. I feel about this as I do about everything else. I can not conceive of any public servant of the country jeopardizing the interests of the country by clinging to any feature of his work that can be better handled, better taken care of, by some other bureau; that is, as we go along from year to year, new things are continually springing up that show conclusively to me that certain features of our work belong to some other arm of the Government. I feel now the time has arrived when the Air Service can materially assist in the expediting the mapping of all our country.

Mr. OLNEY. Maj. LaGuardia asked you a question which I think you can perhaps answer in an estimated way. About how many planes would be useful, or perhaps would be necessary in your work, three or four or five or six?

Col. JONES. Mr. Olney, I am unable to give you even an approximate number, because I feel that while I am pretty thoroughly aware and familiar with what I believe the Air Service should undertake for us, it is a matter of getting together with them and expressing from my angle what I think should be done immediately, and then getting their estimate as to how many machines they will need in order to expedite that work. I belive we may need many more than five or six.

Mr. OLNEY. In the unexplored regions of Alaska, these planes would be of incalculable service to Coast and Geodetic Survey, would they not?

Col. JONES. One of the solutions in the quick development of Alaska with her great resources, which is now almost dormant, is a survey of its coast and its interior, in which the Air Service can render great assistance.

Another important matter is the revision of our coast topography from Calais, Me., to Brownsville, Tex., and from southern

California to the Canadian border on the Pacific coast. That is absolutely imperative. Not only is navigation suffering, but the revision is needed from the point of view of coastal protection from a military point of view, and I do not know of any work, if I was asked the leading question, that should be carried on with more rapidity than this revision work on our coast. It should be immediately undertaken. In many places our topography is practically useless to-day, because it is so changed by development. Forests have been cut down and forests have grown up; towns have deteriorated and other towns have grown up. Some of the mouths to the rivers have changed. All those things can be readily brought out at comparatively small cost by aerial photographs. I speak of this aerial coastal protection with great interest, because I was one of the original members of probably the first committee in this country on aerial coastal patrol, and therefore my interest in these matters dates back many years to the time when I was appointed on that committee.

Mr. OLNEY. What year was that?

Col. JONES. I do not recall, sir. It was about 1914, I think; but I am not certain.

Mr. HULL. Col. Jones, how about using the planes that the Army discards; can that be done?

Col. JONES. You mean discarded by the Army aviators?

Mr. HULL. Yes.

Col. JONES. I should say that bad instruments or antiquated instruments, or airships, as well as other kinds of machinery, shouldn't be used. The best is needed at all times and maintained at the highest efficiency. In our delicate surveying instruments, which probably top the list, not only as to being intricate as well as delicate, we feel that when they become old and antiquated and not up to date that they should be discarded, because we are not getting the best results from them.

Mr. HULL. Of course, I did not mean a plane that was worn out. I mean a plane, for instance, say, a new De Haviland 4, that the Army found they did not want and would discard as a useful plane in the Army. I do not know that anyone can answer the question accurately, because it has not been developed far enough; but it does seem to me that there are planes that the Army has developed, even to the point where they have manufactured them, and then have found those planes not what they wanted, and it seems to me that those planes could be used, perhaps, in services similar to yours.

Col. JONES. Mr. Congressman, I can only answer your question in this way: As we progress in the development of aviation in its various branches I can not believe that any machine that does not meet fully the requirements of the special work they are going to do will be efficient, if there are others that are better and can do the work. Now, I am not in position to tell this committee, as much as I would like to and would if I could, what is the best ship to use in photography at this moment. What was good a year or a year and a half ago might not be the ship at all that is useful now. Please understand me, sir, I am not avoiding your question, because I want to help in every way that is in my power.

Mr. HULL. I understand that.

Col. JONES. But I do not want to make a broad assertion that any ship that is perfectly sound is useful in this photographic work, because it might not be, for various reasons.

Mr. HULL. Do you imagine that for your service you would have to have an especially designed ship, fitted up for your service?

Col. JONES. We would have to have certain equipment on the ship.

Mr. HULL. Yes; I understand that.

Col. JONES. But I do not think, if I can look back a few months, that we would have to have a specially designed ship. My feeling is that our engineers could very quickly and readily show the officer in the Air Service what area we need photographed. After the photographs have been made they would be fitted to the map by using topographic features located by the usual surveying methods. There is not going to be any hitch about it. It is going to be done efficiently and quickly, but much research and experimental work must first be done to develop methods. Therefore, what kind of a plane to use or how it is going to be manipulated I am not directly interested in this as head of the survey, because that is a matter which can best be developed in the Air Service.

Mr. HULL. The probabilities are that any plane that was designed to take photographs for the Army in the field would be such a plane as would meet the requirements of your service.

Col. JONES. Unquestionably, because their work in taking photographs in a large measure is similar to what we are looking forward to having the Air Service do for us.

Mr. LAGUARDIA. And your work would be a splendid experience for such men in preparing them for war work.

Col. JONES. Mr. Chairman, the salvation, to my mind, of the Air Service is looking to its vast development in times of peace and its great commercial value would lead to its equal value and utility in time of war. I believe the Air Service in time of peace will prove infinitely more valuable as a department than the War or Navy departments, and I believe in time of war it will overshadow many of the functions that have heretofore been important in those two military branches.

Mr. LAGUARDIA. We thank you very much, Colonel, for your statement.

STATEMENT OF LIEUT. COL. H. E. HARTNEY, AIR SERVICE, UNITED STATES ARMY.

Mr. LAGUARDIA. Colonel, how long have you been in the Army?

Col. HARTNEY. Since September 15, 1917.

Mr. LAGUARDIA. You are one of the war soldiers?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. And you have seen service overseas?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. You were commander of our first pursuit group, were you not?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. And saw service at the front?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. And you have been honored with the Distinguished Service Cross?

Col. HARTNEY. That is right.

Mr. LAGUARDIA. And the Legion of Honor?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. And the Croix de Guerre?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. And the Italian Silver Medal?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. Now, Colonel, we have had a lot of talk and testimony in this committee in reference to pursuit work. What we want from you is your experience in the development of fighting in the air, the science of fighting in the air, and its relation, if any, with the troops on the ground. We will now hear your statement without any interruption until you are through.

Col. HARTNEY. Mr. Chairman, in answering that question I would like to point out the relationship that I believe the air force will have in the fighting machine of any nation in the future. The Army, to my mind, and I think you will all agree, exists to drive back the infantry, or to drive back the enemy forces. The Navy on the sea exists to drive back those forces in the same way, and the air force of this national fighting machine will be equipped in the future to not only aid in this work, that will be a side-line more or less, but to destroy the enemy lines of communication, and destroy, where it can, enemy forces of any kind—the great portion of the air service which will do that destruction will be termed pursuit aviation.

Pursuit aviation at the beginning of the war, and I will have to speak now from hearsay, although you have asked me to speak of my own experience——

Mr. LAGUARDIA (interposing). That is all right; just go ahead.

Col. HARTNEY. But to illustrate my point, when Germany entered the war she had practically only observation machines; that is, distinctly Army machines for observation purposes, and as the war grew this pursuit element that I think in the future will be so big—and which is really my hobby and a thing I am so keen on—this pursuit aviation gradually developed, first, I think, in 1915, with the German monoplane Fokker, then with the reply from the French in the Nieuport 27, and the British Sopwith single seater, and the triplanes, until the end of the war they had not only single pursuit planes, but two-seaters, and it constituted practically 80 per cent—no, that is not right; in the British force about 65 per cent of the total air force in existence; that is, the destructive arm in itself, something to destroy the enemy's forces and to destroy the enemy's lines of communication.

Now, that shows you roughly how this pursuit aviation was gradually growing from a small thing at first to practically the whole thing at the last. The Army portion of it, or the naval portion of it, was something that had to do with that portion of the fighting machine, the Army and the Navy portion, but this great, new fighting element or destructive element grew up, known as pursuit aviation, and it is divided not only into the fighting machines, but into the bombing machines and bombardment machines. At first this pursuit aviation was essentially to destroy enemy machines in the air, but toward the last it was extending over into

actually destroying enemy airdromes and enemy lines of communication, and it was even beginning to work at night. Up until the beginning of 1918 the French believed that single seaters could not fly at night, but we had to agree that the British demonstrated that they could, and the Americans backed it up by producing night flyers using single seaters. Luke, one of our great aces, next to Rickenbacker, gained most of his victories because he flew his single seater at night. He destroyed these balloons in the dusk of the evening and then flew back into his airdrome and landed at night. These single seaters went a little further—it was all developing so rapidly we could hardly keep up with it—they actually got to destroying enemy forces over on the other side at night by dropping small bombs. You could not stop it, and they found it was great fun. They were cloaked in an array of darkness, as it were, and you could not see them, and the result was that we saw there was a great future in pusuit at night and also in destroying enemy airdromes.

Now, this pursuit aviation, while it was mostly single seater, had to be organized in itself. I mean for day flying. We are speaking of day flying now. It had to be organized into flights of six machines. That is what one human leader can control in the air, roughly, six machines. That leader has to control them. You can not send a man out and tell him what to do. He has to fly after the leader and this flight of six machines must be under his sole control and judgment from the time it leaves the airdrome. He is the show, as it were, of that flight. It was found, however, that these flights of six were not in themselves sufficient, and we had to send out combinations of those flights, all under the control of one leading flight. That gave you a new commander. That was a squadron, and the commander actually had to fly with all these airplanes in the air and lead his three flights. For instance, you might have a squadron of three flights and they would take off from the ground—this actually happened in the war at the last in different fronts with the French, British, and with us—they would send off one squadron of three flights, each flight consisting of six machines. The squadron commander would work with these flights so as to entrap, if possible, the enemy forces and destroy them with the fewest number of losses to himself. It was all a matter of air tactics.

Then we found that we had to send these forces out in other formations; that is, we would have what we called machines for scouting patrols. This leader would be working here [indicating] with his flight, and over here [indicating] the other patrol would be working independently, but keeping in constant touch, so that the air fighting became a matter of the fighting of units and the handling and control of units in the air just as much as on the ground. This great pursuit portion of the Air Service developed so that it was able to gain victories and destroy the enemy with the fewest number of casualties. That was the great feature, you see.

As I said, we only touched on the point of destroying enemy lines of communication. You gentlemen will agree with me that every Army commander has realized the great value of destroying the lines of communications, but we have not been able to do it up to

the present time because we can not do it. It is impossible, as a matter of fact, except by turning the flanks. That was the old movement in the old days of the Army. Each commander tried to turn the flank of the other. The same thing was true in the Navy. Now, the air force comes in from above and hopes to get at these lines of communication, and the fall of the land forces will be inevitable, as a result, if we destroy the lines of communication.

Now, here comes the point—am I going too far?

Mr. LaGuardia. No; go right ahead.

Col. Hartney. We must develop this pursuit aviation, because to destroy these lines of communication we have got to have large quantities of pursuit planes. We have got to have a large personnel with the technical knowledge, and we also have to have a personnel with the tactical and strategic knowledge that is necessary in the handling of them on the front.

Now, if any nation develops that and gets way beyond another nation, which is developing its army and navy airplanes, which are nothing practically in themselves, which are just an adjunct to either the Army or the Navy, then that nation is going to be so far ahead of the other that I think the defeat of all other nations by that nation is absolutely inevitable. As an illustration, if Germany had had that at the beginning of the war, I believe the war would have ended. If she had recognized the position of pursuit aviation and appreciated the fact it could destroy the lines of communication, the war would have ended in 1914. I really believe it would. Before the war the Germans said that this pursuit aviation was all the creation of a poetic mind. They said it was not possible, and yet Ludendorff in all his tracts at the end of the war, said that pursuit aviation was practically the forerunner of any successful maneuvering in the field.

Mr. LaGuardia. Colonel, before you can commence attacking the lines of communication, it will be essential, of course, to have the supremacy of the air against the enemy.

Col. Hartney. Oh, yes.

Mr. LaGuardia. That is elementary.

Col. Hartney. Yes, sir.

Mr. LaGuardia. And that is why it is so necessary to develop an efficient fighting force in the air, because your first battles will be in the air, before you can get at them.

Col. Hartney. Exactly.

Mr. LaGuardia. If your enemy has an equal force with you in the air he can prevent your getting after his lines.

Col. Hartney. Oh, absolutely; yes, sir.

Mr. LaGuardia. Colonel, this is a point which has been disturbing the committee a great deal: In the fighting and in the maintenance of your squadron and in getting your supplies and your spares, and everything you need, is there anything in that in common with the Army on the ground?

Col. Hartney. I do not think there is anything but principles. I must admit that the principles of the organization are the same, but that is about as far as it goes. It is a thing that must be handled by experts in that line, professionals in that line, absolutely, but nothing but principles exist the same.

Mr. LaGuardia. Colonel, you are one of our aces; are you not?

Col. HARTNEY. Yes, sir.

Mr. LAGUARDIA. Colonel, do you believe we can develop an air force such as you believe is necessary to an army that is going to conduct a successful undertaking better by having a united air force so as to have all aviation activities under one head, or go along as we are now with the Army and the Navy divided, to say nothing about the civil departments of the Government; which do you believe in?

Col. HARTNEY. Oh, I am absolutely positive that you must consolidate all our efforts on things aeronautical to get this force that we require.

Mr. HULL. How far do you urge us to go in the personnel; that seems to be the place where we all get lost; that is, control of the operations by personnel. How far would you go with a united air force?

Col. HARTNEY. That is, control of the operation of the tactical units on the front, you mean?

Mr. HULL. Yes; and of the personnel. Do you think it is advisable to have a united air service controlled by a director of the air who would control the personnel of the Navy and of the Army?

Col. HARTNEY. That is, the air personnel of the Army and the Navy?

Mr. HULL. Yes.

Col. HARTNEY. Yes, sir; I do, because they must be detailed to the Navy and to the Army; and then, of course, they will come under the control of the Navy and the Army while they are with them, but the percentage that must go to the Navy and the Army will of necessity only be the percentage that will be sufficient for their needs; in other words, for strictly auxiliary purposes, probably a total altogether, roughly, I should say, 20 per cent of the air force, which will be divided between those two services—probably 10 per cent to the Army and 10 per cent to the Navy. That is just a rough estimate, but it is based on our pursuit and observation aviation proportions at the end of the war.

Mr. HULL. Then you would create a branch that would not be subject to the General Staff of the Army or of the Navy. You would have a separate branch?

Col. HARTNEY. Yes, sir; a branch that would develop its own traditions, its own methods of discipline, and altogether its own organization.

Mr. HULL. When they got on the field of battle, for instance, suppose we were fighting with Mexico, would you have them operate separate from the General Staff?

Col. HARTNEY. Well, there must, of course, be one commander in chief. I have even gone so far, in talking with people, as to prophesy that the day will come when that commander in chief will be an airman. There must be a commander in chief, of course, but there must be responsibility for the air work, and that will be in air service commander in chief, or a commander of the air forces, reporting directly to the Army or Navy commander as the case may be. He will have the responsibility so far as the Air Service is concerned.

Mr. HULL. Would he be under the general in command, or would he be operating separately; that is the point.

Col. HARTNEY. Strategically under the general in command, of course, but he will be operating separately in so far as air tactics are concerned, for he will be the man who understands what his resources are and what he can do. He will be under the command of the commander in chief in the field, of course.

Mr. HULL. You mean the commanding general in the field?

Col. HARTNEY. The commanding general in the field; naval, military, or aerial as the nature of the major warfare may determine. He may possibly be an air man. I mean it is quite conceivable that in time he will be.

Mr. HULL. I understand all that. You would not have these operations conducted by the Air Service separate from the line; you would have it all connected up.

Col. HARTNEY. You mean in Mexico?

Mr. HULL. Well, I am just using that as an illustration.

Col. HARTNEY. Well, I can conceive of a case where they might have an operation without the Army at all. I have never thought of this until this very moment, but there might be an operation against an island, or something of that nature.

Mr. HULL. They might operate in that case from the Navy, and, of course, if they did, they would be under the command of the Navy.

Col. HARTNEY. Exactly. It depends on the nature of the operation.

Mr. LAGUARDIA. We thank you very much, Col. Hartney.

(The committee thereupon took a recess until 7.30 o'clock p. m.)

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Wednesday, December 10, 1919.

The subcommittee met at 10.30 o'clock a. m., Hon. Fiorello H. LaGuardia presiding.

There were present the following members of the subcommittee: Representatives LaGuardia, Hull, Olney, and Fisher.

STATEMENT OF LIEUT. COL. JACOB E. FICKEL, AIR SERVICE.

Mr. LAGUARDIA. Colonel, what are your duties?

Col. FICKEL. I am Chief of the Finance Division of the Air Service.

Mr. LAGUARDIA. You have charge of the records and the books showing appropriations and expenditures?

Col. FICKEL. Yes, sir. In the Air Service.

Mr. LAGUARDIA. In response to a request of this committee, did you confer with Gen. Lord?

Col. FICKEL. I did, sir.

Mr. LAGUARDIA. Can you give us a statement showing the total appropriations for aviation and aviation production from the time this country entered the war until the last appropriation?

Col. FICKEL. Yes, sir; this paper gives that statement in detail, with the revocations.

(The statement follows, marked "Schedule A.")

SCHEDULE A.

War Department, Air Service—Appropriations for aviation purposes made after declaration of war.

Reference.	Act.	Approved.	Title of appropriation.	Amount of appropriation.	Revocation.
Sixty-fifth Congress:					
Public, No. 11	Army	May 12, 1917	Signal Service of the Army, 1918.	$10,800,000	
Public, No. 21	Sundry civil	June 12, 1917	Aviation seacoast defenses, Panama Canal.	500,000	
Public, No. 23	Urgent deficiency.	June 15, 1917	Signal Service of the Army, 1917–18 (act June 15, 1917).	43,450,000	[1] $2,000,000
Public, No. 29	Emergency appropriation.	July 24, 1917	Increase for aviation, Signal Corps, 1918.	640,000,000	
Public, No. 64	Urgent deficiency.	Oct. 6, 1917	Signal Service of the Army, 1918.	40,000,000	
Public, No. 189	Fortifications.	July 8, 1918	Aviation stations, seacoast defenses.	8,000,000	.....
Public, No. 193	Army	July 9, 1918	Air Service production, 1919.	760,000,000	[1] 400,000,000
Public, No. 193	.....do	.....do	Air Service, military, 1919.	124,304,758	[1] 85,000,000
Public, No. 233	Urgent deficiency.	Nov. 4, 1918	.....do	60,000,000	
Sixty-sixth Congress: Public, No. 7	Army	July 11, 1919	Air Service, Army, 1920.	25,000,000	.....
Total appropriated.	.....	.....	.....	1,712,054,758	[1] 487,000,000
Total revocations	.....	.....	.....	487,000,000	.....
Net total	.....	.....	.....	1,225,054,758	.....

[1] Revocations made by act of Congress, No. 275, Feb. 25, 1919.

Mr. LAGUARDIA. Now, Colonel, can you show us what was expended from the appropriation "Public No. 29, Sixty-fifth Congress, Emergency Appropriation, July 24, 1917."

Col. FICKEL. This collection of papers gives the complete statement, and in addition gives some minor appropriations which were included.

Mr. LAGUARDIA. This would show, then, $606,872,404, leaving a balance of $33,127,595.

Col. FICKEL. Yes, sir; this is a statement to the close of the appropriation on June 30, 1919.

(The statement referred to follows, marked "Schedule B.")

SCHEDULE B.

Signal Corps (old)—Statement of transactions as of June 30, 1919.

ANALYSIS OF ALLOTMENTS AS TO CLASSES.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
201. Airplanes and spare parts:			
Airplanes and spare parts	.....	$154,441,236.72	.....
Plant equipment	.....	1,575,448.48	.....
Lumber for airplane construction	.....	220,965.40	.....
Sales section, miscellaneous	.....	2,026,990.90	.....
	$122,700,000.00	160,264,641.50	*$37,564,641.50*

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued.

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
202. Engines and spare parts:			
Engines		$157,644,914.79	
Spare parts		33,591,453.75	
Sales section, miscellaneous		686,627.97	
	$280,770,000.00	191,923,096.51	$88,846,903.49
203. Transportation:			
Motor trucks		19,315,559.54	
Chassis		7,022,928.29	
Motorcycles and side cars		1,705,400.87	
Touring cars		2,713,721.50	
Bicycles		71,887.60	
Trailers		5,228,014.93	
Bodies		2,185,510.39	
Miscellaneous vehicle parts		4,739,740.48	
	35,248,800.00	42,982,863.60	*7,734,063.60*
204. General equipment:			
Lathe and machinery equipment		2,875,923.05	
Hangars		9,528,229.04	
Typewriters		941,139.32	
Tool boxes		894,181.35	
Supplies for aeroplane squadron		2,337,797.29	
Construction and repair squadron		1,248,755.38	
Air Service—Expeditionary Forces		4,000,000.00	
Aviation, radio equipment		830,927.70	
Air speed indicators		148,000.00	
Telephone units		2,833,927.41	
Camp equipment		932,457.41	
Storage batteries		932,979.94	
Fire extinguishers		118,117.50	
Supplies and equipment of infinite variety		5,587,818.22	
Sales section, miscellaneous		777,433.90	
	11,427,800.00	33,987,687.48	*22,559,887.48*
205. Maintenance:			
Authority for and expenses of maintaining training supply depots, Aero Squadron, Aviation Section		852,873.76	
Hangars		59,000.00	
Oils		117,760.63	
Planting castor beans		8,503,279.16	
Castor oil		2,219,480.01	
Miscellaneous maintenance equipment		(20,206.66)	
Sales section, miscellaneous		378,251.42	
Total	22,050,000.00	12,110,438.32	9,939,561.68
206. Special clothing:			
Aviators' clothing		814,115.36	
Aviators' gauntlets		106,489.31	
Aviators' goggles		256,211.30	
Flying suits		485,225.45	
Mechanics' suits		182,509.00	
Overalls		135,043.20	
Chauffeurs' and motor cyclists' clothing		142,901.46	
Sundry items of special clothing		338,159.05	
Sales section, miscellaneous		2,651.74	
Total	1,858,440.00	2,463,305.87	*604,865.87*
207. Machine guns, ammunition, and bombs:			
Allotted to Chief of Ordnance for purchase on account of Signal Corps		20,369,419.38	
Ordered from Chief of Ordnance, machine guns and ammunition		1,040,000.00	
Miscellaneous direct purchase of ammunition, machine-gun parts and accessories		3,656,276.08	
Sales section, miscellaneous		3,566.35	
Total	37,500,000.00	25,069,261.81	12,430,738.19

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued.

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
208. Acquisition of plants:			
General Vehicle Co. plant		$1,595,599.83	
Construction and machinery for new aeronautic plants, including site		1,000,000.00	
Total	$6,000,000.00	2,595,599.83	$3,404,400.17
209. Miscellaneous:			
Gasoline, lubricants, etc., for aviation overseas		696,805.26	
Incidental expenses of offices, stations, and schools, including rent, equipment, and supplies		3,913,184.90	
Aviation naphtha		416,000.00	
Castor oil		64,887.26	
Printing and other sundry expenses of Signal Corps		991,698.61	
Sales section, miscellaneous		1,052,455.69	
Total	7,063,400.00	7,095,617.94	32,217.94
221. Purchase of land		246,217.92	
222. Lease of land		449,863.20	
Total	950,000.00	696,081.12	253,918.88
223. Construction:			
Wichita Falls		1,161,741.74	
Wilbur Wright field		1,034,472.18	
Montgomery, Ala		1,788,991.67	
Hazelhurst field		1,638,073.56	
Arcadia, Fla		2,401,456.68	
Lonoke, Ark		1,823,433.51	
Belleville, Ill		183,433.34	
Mount Clements, Mich		705,876.76	
Rantoul, Ill		127,428.80	
Langley field		908,232.17	
Greenville, N. C		8,309.89	
Supply and repair depot, Dallas, Tex		765,272.96	
Indianapolis, Ind		706,796.23	
Harrisburg, Pa		11,546.73	
Kelley field, San Antonio		776,734.18	
Dayton, Ohio		2,059,601.39	
Camp 2		925,000.00	
Camp 3		850,000.00	
N. P. N. I. Camp		1,829,400.00	
Dallas Training School		1,233,598.11	
Fort Sill, Okla		2,530,700.19	
Fort Worth, Tex		1,544,823.29	
Houston, Tex		2,603,911.75	
Memphis, Tenn		2,147,419.21	
Millington, Tenn		28,212.96	
Mineola, L. I		3,114,298.54	
Lake Charles, La		2,390,725.75	
San Antonio, Tex		4,931,840.14	
Kodak Park, Rochester, N. Y		87,020.06	
Ellington field, Olcott, Tex		28,426.80	
Gerstner field, Holmwood, La		88,618.57	
Americus, Ga		1,597,081.60	
West Point, Miss		1,351,747.35	
Aries, Ga		37,878.72	
Repairs on Arcade Building, Washington, D. C		32,100.00	
Allessandro, Calif		22,458.36	
Balloonton, Tex		14.49	
Morrison, Va		330,110.65	
Benbrook, Tex		499.35	
Mills Station, Calif		870,502.36	
Brooks field, Bergs, Tex		109,041.12	
Garden City, Long Island		19,271.61	
Quartermaster General		3,598,685.00	
Waco, Tex		1,272,477.51	
Richmond, Va		967,624.87	
Radio laboratory, Little Silver, N. J		495,336.09	
Radio Building, Washington, D. C		14,767.00	
Aviation warehouse, Middleton, Pa		64,599.17	
Fort Omaha		195,839.61	

Signal Corps (old)—Statement of transactions as of June 30, 1919—Cont

AN LYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unall bala
223. Construction—Continued.			
San Diego, Calif		$1,793,832.28	
General Supply Depot, Tenth and B Streets, Washington, D. C		$5,888.00	
Willys-Overland, St. Paul, Minn		150,000.00	
Aerial Gunnery School, Larkin, La		5,269.62	
Park field, Tenn		1,768.87	
Miami, Fla		15,063.76	
Aviation Training School, St. Paul, Minn		13,132.50	
Moraine, Ohio		6,316.31	
Johns Hopkins University		1,684.00	
Buffalo Acceptance Park		5,667.78	
Detroit Acceptance Park		3,853.70	
Carruthers field		97,492.20	
Miscellaneous construction		3,805,083.11	
Total	$30.506,400.00	57,293,583.95	$26,78
224. Construction of buildings abroad.			
Authority for foreign construction		500,000.00	
Construction of miscellaneous buildings abroad		7,018,993.81	
Total	10,000,000.00	7,518,993.81	2,48
241. Balloons	11,800,000.00	7,165,606.16	4,63
242. Balloon accessories	1,000,000.00	805,114.76	49
243. Balloon buildings, balloon hangars	995,000.00	111,993.09	88
244. Transportation—balloon division:			
Motor trucks		312,527.46	
Touring cars		224,743.16	
Motor cycles and trailer cars		97,093.55	
Trailers		25,670.00	
Tractor		4,000.00	
Bodies		65,103.40	
Special vehicle equipment and spare parts		137,076.75	
Chassis		182,000.00	
Total	5,000,000.00	1,048,214.32	3,95
245. Gas, including containers for balloons:			
Hydrogen, cylinders, etc		3,202,650.54	
Allotted to Bureau of Mines for development purposes		193,947.82	
Total	5,000,000.00	3,396.598.36	1,60
246. Miscellaneous—balloon division:			
Authorities for purchase of equipment and miscellaneous expenses of balloon division		932,729.68	
Other expenses of balloon division		807,319.11	
Total	3,324,550.00	1,740,048.79	1,58
261. Aeronautical schools—maintenance:			
Authorities to pay expenses of		981,773.67	
Miscellaneous expenses of		76,915.25	
Total	1,056,000.00	1,058,688.92	
281. Expenses on special duty, at home and abroad	67,200.00	50,412.32	1
82. Pay of Reserve Corps and traveling expenses:			
Allotted to Quartermaster General		13,925,000.00	
Authorized to disbursing office, Dayton, Ohio		4,462.61	
Total	31,627,862.00	13,929,462.61	17,69
283. Pay of civilian employees	5,720,000.00	3,385,499.39	2,33
284. Vocational training	120,000.00	235,464.09	11
285. Subsistence and travel of students	756,000.00		75
286. Experimental investigations:			
Allotted to experimental laboratory		200,000.00	
Other expenses incidental to experimental investigation		3,143,884.08	
Total	1,458,548.00	3,343,884.08	1,88
287. Miscellaneous expenses	900,000.00	112,955.07	78

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued.

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
288. Departments and depots:			
Aviation general supply depot		$61,178.76	
Eastern Department		1,000.00	
Western Department		35,693.25	
Disbursing office, Mineola		5,000.00	
Southeastern Department		*7,498.54*	
Total	$1,000,000.00	140,373.47	$859,626.53
289. Reserve for foreign expenditures	4,800,000.00	26,600,000.00	*22,600,000.00*
290. Expenses of aircraft board	100,000.00	46,916.93	53,083.07
Grand total	640,000,000.00	606,872,404.10	33,127,595.90
Signal Service of the Army, 1917-18 (Aeronautics):			
75. Civilian employees		95,411.23	
76. Airplanes and seaplanes		9,973,438.75	
77. Spare parts and accessories		1,401,966.99	
78. Engines and spare parts		2,836,392.65	
79. Construction		9,023,796.24	
80. Motor vehicles		1,455,520.25	
81. Leasing of land		101,243.20	
82. Maintenance and operation of schools		1,226,057.80	
83. Development and experimental work		435,206.51	
84. Miscellaneous		1,909,789.23	
85. Reserve officers and enlisted men		2,684.40	
86. Purchase of land		243,262.00	
88. Maintenance and operation of squadron		274,407.68	
89. Balloons		767,159.08	
90. Spare parts and accessories for balloons		304,711.91	
92. Development of experimental work		83,002.50	
94. Tuition and textbooks		1,325,074.79	
95. Photograph for aircraft		6,580.40	
96. Radio for aircraft		484.62	
98. Miscellaneous (Balloon Division)		13,171.96	
99. Transportation (Balloon Division)		665,613.30	
Total, aeronautics		32,144,975.49	
Signal Service of the Army, 1917-18 (Signal Service):			
2. Incidentals—Departments and depots—			
Authorities for expenses, Southern Department		46,795.85	
Authorities for shipping and repairs of supplies		80,000.00	
Other expenses		60,112.82	
Total		186,908.67	
3. Mobile Army equipment, except radio—			
Field glasses		2,700,000.00	
Telephone systems and apparatus, including field and outpost wire		3,409,870.39	
Cable		441,105.00	
Flags and semaphores		114,158.73	
Heliographs		154,360.00	
Lines of communication for expeditionary forces		250,000.00	
Motor vehicles		351,668.17	
Photographic supplies		7,135.92	
Material, supplies, and equipment of infinite variety		5,116,509.49	
Total		12,544,807.70	
4. Radio equipment		1,169,130.22	
5. Motor vehicles—			
Authorization and purchase of vehicles abroad		59,781.80	
Orders from Quartermaster General		903,611.97	
Other motor vehicles		356,694.38	
Total		1,320,088.15	
6. Post telephone and target ranges		176,783.66	
9. Miscellaneous expenses		56,319.73	

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued.

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
Signal Service of the Army, 1917-18 (Signal Service)—Continued.			
12. Supplies bought in United States		$2,123.59	
15. Supplies		1,685.74	
18. Supplies bought in United States		15.45	
Total, Signal Service		15,457,862.91	
Grand total, Signal Service, Army, 1917-18	$47,267,766.00	47,602,838.40	*$335,072.40*
Signal Service of the Army, 1918 (aeronautics):			
75. Civilian employees		1,468,884.65	
76. Airplanes and seaplanes		100,000.00	
77. Spare parts and accessories		12,142.80	
78. Extra engines and spare parts		3,680,787.34	
79. Construction		3,000.00	
81. Leasing of land		16,437.50	
82. Maintenance and operation of schools		438,589.37	
83. Development of experimental work		9,970.41	
84. Miscellaneous		37,694.94	
85. Pay of officers and enlisted men		1,934,090.86	
89. Balloons		76,906.93	
96. Wire for aircraft		63,326.05	
97. Mileage		450,000.00	
98. Miscellaneous (Balloon Division)		1,297.88	
Total, aeronautics		8,293,128.73	
Signal Service of the Army, 1918 (Signal Service):			
1. Salaries except Seattle		303,114.70	
2. Incidentals—departments and depots—			
Authorization for incidental expenses of expeditionary forces		3,946,937.78	
Authorization for overseas purchase of equipment		4,000,000.00	
Authorization for other incidental expenses		2,034,863.14	
Total		9,981,800.92	
3. Mobile Army equipment except radio—			
Copper		1,106,728.98	
Telephone systems and apparatus, including field and outpost wire		11,922,015.78	
Cable		1,641,065.49	
Armoring cable		549,168.00	
Field glasses		5,003,124.99	
Squeekers and feed		52,899.85	
Flags and flag cases		753,040.07	
Materials and supplies of infinite variety		2,208,574.64	
Total		23,236,617.80	
4. Radio equipment		4,506,113.15	
5. Motor vehicles—			
Trucks		1,487,229.35	
Touring cars		131,644.03	
Motorcycles and side cars		364,778.22	
Chassis		346,127.00	
Bodies		61,368.95	
Trailers		3,784.88	
Bicycles		19,000.00	
Motor equipment		72,940.21	
Miscellaneous vehicle parts		41,272.14	
Total		2,528,144.78	
6. Post telephone and target ranges		766,568.22	
9. Miscellaneous		248,437.21	
10. Signal Service, Army, Philippines, salaries		4,101.30	
11. Signal Service, Army, Philippines, local expenditures		11,194.38	
12. Signal Service, Army, Philippines, supplies bought in United States		1,314.74	

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued.

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
Signal Service of the Army, 1918 (Signal Service)—Continued.			
13. Signal Service, Army, Alaska, salaries, including Seattle		$11,782.76	
14. Signal Service, Army, Alaska, local expenditures, including Seattle		23,883.70	
15. Signal Service, Army, Alaska, supplies		18,237.51	
16. Signal Service, Army, Hawaii, salaries		1,163.94	
17. Signal Service, Army, Hawaii, local expenditures		5,863.76	
Total, Signal Service		41,648,338.87	
Grand total, Signal Service, Army, 1918	$49,800,000.00	49,941,467.60	$141,467.60
Aviation seacoast defenses:			
75. Construction		1,745.01	
78. Extra engines and spare parts		20,000.00	
79. Construction		596.09	
82. Maintenance and operation of schools		18,432.37	
84. Miscellaneous		15.40	
89. Balloons		107.81	
90. Spare parts and accessories for balloons		131.50	
98. Miscellaneous, Balloon Division		5,000.00	
Total, aviation, seacoast defenses	2,839,010.98	4,836.00	2,834,174.98
Aviation, seacoast defenses, insular possessions, Hawaii:			
75. Civilian employees		2,491.67	
77. Spare parts and accessories		10,586.91	
79. Construction		75,000.00	
81. Lease of land		10,180.45	
82. Maintenance and operation of schools		5,178.87	
Total, aviation, seacoast defenses, insular possessions, Hawaii	438,677.97	73,906.34	364,771.63
Aviation, seacoast defenses, insular possessions, Philippines:			
75. Civilian employees		1,275.00	
77. Spare parts and accessories		.44	
78. Extra engines and spare parts		1,358.50	
79. Construction		148.95	
82. Maintenance and operation of schools		4,259.72	
83. Maintenance and operation of squadrons		869.11	
Total, aviation, seacoast defenses, insular possessions, Philippines	578,110.36	3,436.50	581,546.86
Aviation, seacoast defenses, Panama Canal:			
75. Civilian employees		4,825.83	
79. Construction		468,000.00	
88. Maintenance and operation of squadrons		7,938.84	
Total, aviation, seacoast defenses, Panama Canal	500.000 00	480,764.67	19,235.33
Aviation, Navy, 1917-18: Allotted to Bureau of Mines	350,000.00	349,735.20	264.80
Signal Service of the Army (no year):			
79. Construction	4,500,000.00	4,336,496.89	163,503.11
Maintenance, etc., fire-control installations at seacoast defenses:			
C. Salaries, except cable ship Joseph Henry		17,765.15	
E. Incidental expenses by departments and depots		22,813.45	
F. District signal station, including radio and visual signaling equipment		7,447.12	
G. Submarine cables and reels		462.18	
H. Aerial and subterranean cables and reels		7,195.74	
I. Post telephone system, permanent equipment		2,144.08	
J. Fire-control apparatus		3,984.38	
K. Power equipment		380.88	

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	3. Classification of allotments.	4. Unallotted balance.
Maintenance, etc., fire-control installations at seacoast defenses—Continued.			
M. Testing instruments and tools		83,544.32	
N. Construction and other expendable material		25,107.76	
O. Photo supplies, except laboratory		1,056.52	
P. Laboratory		2,352.64	
Q. Miscellaneous		1,712.55	
R. Salaries, cable ship Joseph Henry		3,310.69	
V. Supplies and expenses, Joseph Henry		116.66	
Total, maintenance, etc., fire-control installations at seacoast defenses	$141,339.43	69,209.16	$72,130.27
Maintenance, etc., fire-control installations at seacoast defenses, insular possessions:			
40. Salaries, Philippine Department		2,497.42	
41. Local expenditures		2,010.04	
42. Insular possessions		1,164.33	
43. Local expenditures, Hawaii		319.33	
44. District signal stations		253.65	
48. Fire-control apparatus		304.92	
51. Construction and other expendable material		4,789.35	
52. Miscellaneous		64.85	
Total, maintenance etc., fire-control installations at seacoast defenses, insular possessions	12,506.58	11,274.19	1,232.39
Maintenance, etc., fire-control installations at seacoast defenses Panama Canal:			
61. Local expenditures		242.07	
62. District signal stations, including all radio and visual equipment		556.27	
64. Aerial and subterranean cable		1,611.12	
65. Post telephone systems, permanent equipment		126.50	
66. Fire-control apparatus		2,324.18	
67. Power equipment		254.00	
68. Testing instruments and tools		23.90	
69. Construction and other expendable material including wire, poles, dry cells, etc		4,977.55	
70. Miscellaneous supplies and services		152.79	
Total, maintenance etc., fire-control installations at seacoast defenses, Panama Canal	10,650.68	10,268.38	382.30
Washington-Alaska Military Cable and Telegraph System, 1918-19:			
2. Rebuilding and betterments to the military telegraph lines on second section		3,077.00	
3. Rebuilding and betterments to the military telegraph lines on first section		20,888.28	
4. Extension, betterments, and maintenance of the Alaska Cable System		17,528.96	
5. Salaries of the transport Burnside		5,760.00	
Total Washington-Alaska Military Cable and Telegraph System, 1918-19	50,000.00	47,254.24	2,745.76
Signal equipment, Enlisted Reserve Corps, 1918	300,000.00	296,866.48	3,133.52
Commercial telephone service at Coast Artillery posts	13,500.00	13,461.16	38.84
Fire-control in insular possessions:			
T. Fire-control installation in Pearl Harbor and Honolulu		4,588.73	
U. Fire-control installation at Lubig and Manila Bays		3,887.92	
U-1. Supplies for Fort Drum installation, Philippine Islands		574.73	
Total, fire-control in insular possessions	12,834.38	9,051.38	3,783.00

Signal Corps (old)—Statement of transactions as of June 30, 1919—Continued.

ANALYSIS OF ALLOTMENTS AS TO CLASSES—Continued.

1. Allotments.	2. Amount of appropriation.	2. Classification of allotments.	4. Unalloted balance.
Fire control at fortifications:			
L-1. Fire control systems in the coast defenses at Los Angeles	.....	$1,392.03	.....
M-1. Fire control systems in the coast defenses at San Diego	.....	.....	.....
1. Emergency material for Coast Artillery posts	.....	*6,964.90*	.....
T-1. Fire control communication lines between Fort Miley and Lake Mercer Reservations	.....	3,658.08	.....
Total, fire control at fortifications	$16,025.90	*1,914.79*	$17,940.69
Fire control at fortifications, act June 15, 1917:			
A. Extension of post telephone system at Fort Mills	.....	1,787.00	.....
B. Cable connecting Fort Mills and Fort Hughes	.....	16,194.99	.....
C. Purchase of zone signal equipment for mortar batteries at Fort Mills and Fort Hughes	.....	232.50	.....
D. Purchase of cable-laying machine	.....	5,000.00	.....
G. Fire-control systems at certain intermediate and minor caliber batteries	.....	122,757.19	.....
H. Extension to fire-control installations in Coast Artillery posts in United States	.....	71,191.44	.....
Total fire control at fortifications June 15, 1917	446,761.96	217,163.12	229,598.84
Contingent expenses, seacoast fortifications, June 15, 1917:			
1. Fire-control battery, Birkheimer, Diamond Head Crater Oahu	.....	13,471.94	.....
2. Installation at battery Craighill, Fort Hughes	.....	4,109.80	.....
3. Cable connecting Forts Mills and Drum	.....	29,015.06	.....
Total contingent expense, seacoast fortifications, June 15, 1917	51,038.68	46,596.80	4,441.88
Board of Ordnance and Fortifications:			
65. Development of radio control of torpedoes from airplanes	.....	674.03	.....
Total, Board of Ordnance and Fortifications	1,189.13	674.03	515.10
Replacing seacoast supplies and equipment, 1917-18	237,684.05	138,049.74	99,634.31
Replacing seacoast supplies and equipment, 1918-19	730,057.41	145,966.51	584,090.90
Supplies, services, and transportation, 1918:			
1. Supplies, service, and transportation	15,000.00	13,704.27	1,295.75
2. Telephone lines and connections in New York and vicinity	1,882.73	.....	1,882.73
Total supplies, services, and transportation, 1918	16,882.73	13,704.27	3,178.46
Total miscellaneous:			
Sales 525, I. A. S. C., 1918	.....	73,298,460.52	*73,298,460.52*
Grand total, Signal Corps (old) appropriation	640,000,000.00	606,872,404.10	33,127,595.90
The following appropriations were dropped from all statements after Apr. 30, 1919:			
Ordnance and ordnance stores, Bureau of Ordnance, 1917-18:			
Allotment No. 1	.....	2,500.68	.....
Allotment No. 2	.....	7,100.00	.....
Total ordnance and ordnance stores	9,600.68	9,600.68	.....
Supplies, services, and transportation, 1917-18:			
Allotment No. 3	100,000.00	100,000.00	.....

Mr. LAGUARDIA. Your next big appropriation, Colonel, is Public No. 193, Sixty-fifth Congress, Air Service (Production), 1919, of $760,000,000.

Col. FICKEL. Yes, sir; that is carried in this statement.

(The statement referred to follows, marked "Schedule C.")

SCHEDULE C.

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919.

[Appropriation, "Air Service (Production), 1919."]

TREASURY BALANCES OF CURRENT APPROPRIATIONS.

1 Title of appropriation.	2 Amount of appropriation.	3 Withdrawals from Treasury.	4 Treasury balance.
Air Service (Production), 1919	$360,000,000.00	$203,396,391.40	$156,603,608.60
Increase compensation, Military Establishment, 1919	.....	65,053.17	*65,053.17*
Aviation, Navy, 1919	381,000.00	273,938.11	107,061.89
National Security and defense, War Department, 1919	55,000.00	31,944.23	23,055.77
Funds transferred from other supply bureaus	301,252.21	220,835.49	80,416.72
Total	360.737,252.21	203,988,162.40	156,749,089.81

ALLOTMENTS INCURRED AND PAID.

1 Appropriation and apportionment.	2 Allotments incurred.	3 Allotments paid.	4 Balance due.
Air Service (Production), 1919:			
501. Airplanes and spare parts	$29,231,666.53	$13,976,625.28	$15,255,041.25
502. Airplane instruments and accessories	7,708,598.51	3,223,196.78	4,465,401.73
503. Enginesand repair parts	94,986,468.39	79,306,676.40	15,679,791.99
504. Engine instruments and accessories	911,508.78	583,410.71	328,098.07
505. Balloons and spare parts	3,918,899.30	2,736,472.50	1,182,426.80
506. Balloon instruments and accessories	1,604,543.24	579,104.11	1,025,439.13
507. Oils, gases, and chemicals	6,031,038.51	3,904,370.68	2,126,667.83
508. Special clothing for aviation	2,449,912.50	2,137,460.04	312,452.46
509. Transportation equipment	1,210,515.67	455,988.34	754,527.33
510. Purchase and lease of land	159,530.07	118,537.81	40,992.26
511. Plants and plant equipment	2,070,113.43	1,936,742.63	133,370.80
512. Experimental and research	6,749,541.48	4,392,917.87	2,356,623.6
513. Miscellaneous equipment and supplies	24,120,943.15	23,025,596.37	1,095,346.78
514. Pay, subsistence, and traveling expenses of Reserve Corps and civilians	13,231,007.85	10,489,304.85	2,741,703.00
515. Foreign expenditures	93,780,200.00	26,473,500.00	67,306,700.00
Total	288,164,487.41	173,339,904.37	114,824,583.04
Apportionment 525, materials for resale	16,421,126.13	16,249,381.82	171,744.31
Pay, subsistence, and traveling expenses of Reserve Corps and civilians	425,137.79	246,905.17	178,232.62
Experimental and research	288,500.00	137,344.14	151,155.86
Miscellaneous equipment and supplies	11,944.23	9,244.12	2,700.11
Aviation, Navy, 1917-18	8,133.24	1,227.88	6,905.36
Funds transferred from other supply bureaus	213,673.71	58,365.65	155,308.06
Grand total	305,533,002.51	190,042,373.15	115,490,629.36

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

SUMMARY.

1 Appropriation and apportionment.	2 Amount of appropriation or apportionment.	3 Allotments.	4 Unallotted balance.
Air Service (Production), 1919:			
501. Airplanes and spare parts	$81,000,000.00	$29,231,666.53	$51,768,333.47
502. Airplane instruments and accessories	9,000,000.00	7,708,598.51	1,291,401.49
503. Engines and repair parts	125,000,000.00	94,986,468.39	30,013,531.61
504. Engine instruments and accessories	2,000,000.00	911,508.78	1,088,491.22
505. Balloons and spare parts	12,000,000.00	3,918,899.30	8,081,100.70
506. Balloon instruments and accessories	500,000.00	1,604,543.24	*1,104,543.24*
507. Oils, gases, and chemicals	1,000,000.00	6,031,038.51	*5,031,038.51*
508. Special clothing for aviation	500,000.00	2,449,912.50	*1,949,912.50*
509. Transportation equipment	14,000,000.00	1,210,515.67	12,789,484.33
510. Purchase and lease of land	1,500,000.00	159,530.07	1,340,469.93
511. Plants and plant equipment	2,000,000.00	2,070,113.43	*70,113.43*
512. Experimental and research	2,500,000.00	6,749,541.48	*4,249,541.48*
513. Miscellaneous equipment and supplies	13,000,000.00	24,120,943.15	*11,120,943.15*
514. Pay, subsistence, and traveling expenses of Reserve Corps and civilians	2,000,000.00	13,231,007.85	*11,231,007.85*
515. Foreign expenditures	94,000,000.00	93,780,200.00	219,800.00
Total	360,000,000.00	288,164,487.41	71,835,512.59
Apportionment 525, materials for resale		16,421,126.13	*16,421,126.13*
Pay, subsistence, and traveling expenses of Reserve Corps and civilians	291,030.02	425,137.79	*134,107.77*
Experimental and research	381,000.00	288,500.00	92,500.00
Miscellaneous equipment and supplies	55,000.00	11,944.23	43,055.77
Aviation, Navy, 1917–18	8,133.24	8,133.24	
Funds transferred from other supply bureaus	300,921.01	213,673.71	87,247.30
Grand total	361,036,084.27	305,533,002.51	55,503,081.76

AIR SERVICE (PRODUCTION), JUNE 30, 1919.

1 Allotments.	2 Amount of appropriation or apportionment.	3 Classification of allotments.	4 Unallotted balance.
501. Airplanes and spare parts:			
Primary training planes		$5,391,963.98	
Advanced training planes		6,325,494.77	
Observation planes		93,784.50	
Bombing planes		11,107,558.55	
Pursuit planes		895,644.43	
Hydroplanes and sea planes		3,253,631.86	
Miscellaneous spare parts		2,163,588.44	
Total	$81,000,000.00	29,231,666.53	$51,768,333.47
502. Airplane instruments and accessories:			
Clocks		68,450.25	
Speed indicators		369,026.96	
Pressure gauges		148,091.29	
Aneroid barometers		218,134.67	
Barometers		2,571.52	
Compasses		899,413.50	
Safety belts		188,038.76	
Tachometers		47,738.21	
Thermometers		71,400.00	
Radio apparatus		1,908,086.01	
Photographic equipment		1,085,683.19	
Interrupter gears		535,084.65	
Miscellaneous		2,166,879.50	
Total	9,000,000.00	7,708,598.51	1,291,401.49

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

AIR SERVICE (PRODUCTION), JUNE 30, 1919—Continued.

1 Allotments.	2 Amount of appropriation or apportionment.	3 Classification of allotments.	4 Unallotted balance.
503. Engines and repair parts:			
Buggatti		$13,638.60	
Curtiss OX-5		4,498,298.57	
Gnome		57,307.98	
Hall Scott A-7-A		51.01	
Hispano Suiza		22,071,059.68	
Le Rhone		946,333.08	
Liberty		64,807,459.41	
Miscellaneous spare parts		2,552,320.06	
Hawk Rolls Royce		30,000.00	
Total	$125,000,000.00	94,986,468.39	$30,013,531.61
504. Engine instruments and accessories:			
Gasoline gauges		6,762.48	
Oil gauges		1,762.10	
Miscellaneous		902,984.20	
Total	2,000,000.00	911,508.78	1,088,491.22
505. Balloons and spare parts:			
Balloons		1,219,584.18	
Spare parts		2,699,315.12	
Total	12,000,000.00	3,918,899.30	8,081,100.70
506. Balloon instruments and accessories:			
Parachutes		361,106.40	
Guy anchors		5,988.40	
Ground cloth		8,155.93	
Telephone equipment		173,651.70	
Tools		164.90	
Miscellaneous instruments and accessories		1,055,475.91	
Total	500,000.00	1,604,543.24	*1,104,543.24*
507. Oils, gases, and chemicals:			
Gasoline		57.75	
Castor oil		2,307,488.31	
Gases		2,736,740.00	
Chemicals		986,007.66	
Miscellaneous oils and gases		744.69	
Total	1,000,000.00	6,031,038.51	*5,031,038.51*
508. Special clothing for aviation:			
Flying suits		838,564.54	
Goggles		38,908.78	
Gauntlets		267,753.23	
Helmets		147,268.86	
Mechanic suits		208,000.00	
Moccasins		47,622.77	
Sundry items of special clothing		901,794.32	
Total	500,000.00	2,449,912.50	*1,949,912.50*
509. Transportation equipment:			
Motor trucks		965,393.00	
Touring cars		6,267.33	
Chassis		5,900.00	
Motorcycles and side cars		731.30	
Miscellaneous vehicles, spare parts, and sundries		232,224.04	
Total	14,000,000.00	1,210,515.67	12,789,484.33
510. Purchase and lease of land:			
Plant sites		157,685.80	
Warehouse sites		1,844.27	
Total	1,500,000.00	159,530.07	1,340,469.93
511. Plants and plant equipment:			
Acquisition of plants		1,275,008.02	
Acquisition of depots		622,205.41	
Purchase of equipment		172,900.00	
Total	2,000,000.00	2,070,113.43	*70,113.43*

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

AIR SERVICE (PRODUCTION), JUNE 30, 1919—Continued.

1 Allotments.	2 Amount of appropriation or apportionment.	3 Classification of allotments.	4 Unallotted balance.
512. Experimental and research:			
Experiments, investigations, purchase and development in connection with new types of airplanes and engines		$6,033,798.33	
Miscellaneous experiments and investigation		715,743.15	
Total	$2,500,000.00	6,749,541.48	*$4,249,541.48*
513. Miscellaneous equipment and supplies:			
Furniture and fixtures		126,259.29	
Office supplies		67,740.06	
Printing		29,556.80	
Publication		11,041.64	
Services		394,652.68	
Miscellaneous equipment		237,673.43	
Miscellaneous supplies		1,654,011.25	
Expense of Aircraft Board		15.00	
Capital stock United States Spruce Production Corporation		21,599,993.00	
Total	13,000,000.00	24,120,943.15	*11,120,943.15*
514. Pay, subsistence, and traveling expenses of Reserve Corps and civilians:			
Reserve Corps		1,500,000.00	
Civilians		11,731,007.85	
Total	2,000,000.00	13,231,007.85	*11,231,007.85*
515. Foreign expenditures:			
Airplanes and spare parts		2,600,000.00	
Balloons and spare parts		110,000.00	
Plants and plant equipment		3,000,000.00	
Undistributed		88,070,200.00	
Total	94,000,000.00	93,780,200.00	219,800.00
Total Air Service (Production)	360,000,000.00	288,164,487.41	71,835,512.59
525. Materials for resale:			
Airplanes		7,584.03	
Engines		415,552.04	
Lumber		999,669.61	
Instruments		929,714.18	
Airplane and engine accessories		295,314.66	
Fabric		7,673,595.10	
Fabricated parts		2,654,540.98	
Chemicals		2,743,785.47	
Engine gauges		212,340.90	
Ordnance for Navy		14,970.59	
Glass		188.41	
Miscellaneous		909,059.94	
Payments on account		*435,189.73*	
Total		16,421,126.13	*16,421,126.13*
National Security and Defense, War Department 1919:			
Loyal Legion of Lumbermen and Loggers		1,944.23	
Subsistence of British officers technically trained in aircraft production		10,000.00	
Total	55,000.00	11,944.23	43,055.77
Aviation, Navy, 1917–18	8,133.24	8,133.24	
Aviation, Navy, 1919	381,000.00	288,500.00	92,500.00
Increase compensation, Military Establishment, 1919	291,030.02	425,137.79	*134,107.77*
Funds transferred from other supply bureaus	300,921.01	213,673.71	87,247.30
Grand total	361,036,084.27	305,533,002.51	55,503,081.76

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

SUMMARY OF FUNDS TRANSFERRED FROM OTHER SUPPLY BUREAUS TO JUNE 30, 1919.

1 Appropriation.	2 Bureau.	3 Amount.
A. of F., "C"	Chemical Warfare Service	$2,797.34
Chemical Warfare Service, 1919, Army	do	325.00
General appropriations, Quartermaster Corps, 1919.	Construction Division	776.54
Engineer equipment for troops	Engineer Corps	405.00
Engineer operations in the field	do	102,912.95
Medical and hospital departments, 1919	Medical Corps	68,343.79
A. of F., "B"	Ordnance Corps	1,885.73
A. of F., "C"	do	7,363.44
Aberdeen Proving Ground, stock account	do	90.00
Armored motor cars	do	5,126.02
Manufacture of arms, 1918-19	do	15.20
Nitrate plants, 1919	do	4,461.80
Ordnance stores and supplies, 1918-19	do	153.52
Rock Island Arsenal, stock account O. S. & S., 1918-19.	do	100.00
Allotment No. 84	Quartermaster Corps	1,359.20
General appropriations, Quartermaster Corps, 1919.	do	51.70
Signal Service of the Army, 1919	Signal Corps	16,994.50
	Tank Corps	331.98
Total		213,673.71

STATEMENT OF TRANSACTIONS, FISCAL YEAR 1919.

Amount of appropriations (Treasury balance)	$360,737,252.21
Withdrawals from Treasury	203,988,162.40
Treasury balance June 30, 1919	156,749,089.81
Allotments incurred	305,533,002.51
Allotments paid	190,042,373.15
Balance of allotments unpaid	115,490,629.36
Summary as to condition of current appropriations	361,036,084.27
Obligations, June 30, 1919	305,533,002.51
Unallotted balance June 30, 1919	56,503,081.76

Mr. LaGuardia. Can you tell us the total out of that $760,000,000?

Col. Fickel. This $760,000,000 included also part of this appropriation "Air Service, Military."

Mr. LaGuardia. That is, $124,000,000.

Col. Fickel. Yes, sir; there are three appropriations which should be considered there together.

Mr. LaGuardia. What are they?

Col. Fickel. Public No. 193, Sixty-fifth Congress, of $760,000,000, Public 193, Sixty-fifth Congress, of $124,304,758, and Public No. 233, Sixty-fifth Congress, of $60,000,000. At first these three appropriations were carried under one heading, but at the time the bureau of aircraft production and military aeronautics were divided and taken away from the Signal Corps, the appropriation was divided, giving the bureau of aircraft production $760,000,000, and the department of military aeronautics $184,304,758. This $400,000,000 carried in the outside column of Schedule A is a revocation by the act of Congress approved February 25, 1919, from the appropriation which was allotted to the bureau of aircraft production. The $85,000,000 carried in the outside column of Schedule A is the revocation made by the act of Congress approved February 25, 1919. In addition to that there was a further revocation of $2,000,000 from some of the previous appropriations, from Signal Service of

the Army, 1918, approved May 12, 1917, and from Signal Service of the Army, 1918, approved October 6, 1917.

Mr. LAGUARDIA. Now, Colonel, you are going to give us the total expenditures out of the $760,000,000 and the $124,000,000 appropriation.

Col. FICKEL. $288,164,487.41 were actually allotted to June 30, 1919, out of the $760,000,000.

Mr. OLNEY. Was the balance turned back into the Treasury.

Col. FICKEL. Yes, sir; and out of the two appropriations combined, which make up $184,304,758, there was allotted $93,783,183.33 to June 30, 1919.

Mr. LAGUARDIA. And that is contained in the third financial statement, marked "Schedule D."

Col. FICKEL. Yes, sir.

(The statement referred to follows, marked "Schedule D.")

SCHEDULE D.

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919.

[Appropriation, "Air Service (Military), 1919."]

TREASURY BALANCES OF CURRENT APPROPRIATIONS.

1 Title of appropriation.	2 Amount of appropriation.	3 Withdrawals from Treasury.	4 Treasury balance.
Air Service, Military, 1919	$99,304,758.00	$64,390,372.12	$34,914,385.88
Aviation stations, seacoast defenses	8,000 000.00	420,041.48	7,579,958.52
Increase compensation, Military Establishment, 1919	.....	116,464.86	*116,464.86*
Aviation seacoast defenses (no limit)	63,918.66	.....	63,918.66
Signal Service of the Army, 1919	10,640.56	.....	10,640.56
Inland and port, storage and shipping facilities	734.42	734.42	.....
Total	107,380,051.64	64,927,612.88	42,452,438.76

ALLOTMENTS INCURRED AND PAID.

1 Appropriation and apportionment.	2 Allotments incurred, including reservations.	3 Allotments paid.	4 Balance due.
Air Service, military, 1919:			
301. General equipment	$4,944,030.44	$3,013,747.22	$1,930,283.22
302. Transportation equipment	1,929,747.04	868,594.62	1,061,152.42
303. Maintenance	2,800,874.02	1,440,632.71	1,360,241.31
304. Purchase and lease of land	2,984,910.68	611,388.40	2,373,522.28
305. Construction of buildings	17,715,480.57	11,284,667.62	6,430,812.95
306. Maintenance and operation in United States possessions	512,417.07	38,917.33	473,499.74
307. Maintenance and operation of schools	2,973,999.23	1,413,394.31	1,560,604.92
308. Pay, subsistence, traveling expenses of Reserve Corps, civilians, and students	6,368,109.48	5,047,668.46	1,320,441.02
309. Experimental and research	392,161.78	136,900.23	255,261.55
310. Miscellaneous expenses and supplies	5,021,920.66	3,096,708.59	1,925,212.07
311. Foreign expenditures	45,761,539.73	.....	45,761,539.73
312. Oils, gases, and chemicals	530,121.11	292,168.76	237,952.35
Total	91,935,311.81	27,244,788.25	64,690,523.56
Aviation stations, seacoast defenses	1,709,591.48	.....	1,709,591.48
Increase compensation, military establishment, 1919	137,545.62	82,755.34	54,790.28
Inland and port, storage and shipping facilities	734.42	293.59	440.83
Grand total	93,783,183.33	27,327,837.18	66,455,346.15

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

SUMMARY.

1 Appropriation and apportionment.	2 Amount of appropriation or apportionment.	3 Allotments.	4 Unallotted balance.
Air Service, military, 1919:			
301. General equipment	$6,000,000.00	$4,944,030.44	$1,055,969.56
302. Transportation equipment	2,000,000.00	1,929,747.04	70,252.96
303. Maintenance	3,500,000.00	2,800,874.02	699,125.98
304. Purchase and lease of land	3,500,000.00	2,984,910.68	515,089.32
305. Construction of buildings	14,300,000.00	17,715,480.57	3,415,480.57
306. Maintenance and operation in United States possessions	354,758.00	512,417.07	157,659.07
307. Maintenance and operation of schools	4,700,000.00	2,973,999.23	1,726,000.77
308. Pay, subsistence, and traveling expenses of Reserve Corps, civilians, and students	7,800,000.00	6,368,109.48	1,431,890.52
309. Experimental and research	450,000.00	392,161.78	57,838.22
310. Miscellaneous expenses and supplies	5,700,000.00	5,021,920.66	678,079.34
311. Foreign expenditures	50,000,000.00	45,761,539.73	4,238,460.27
312. Oils, gases, and chemicals	1,000,000.00	530,121.11	469,878.89
Total	99,304,758.00	91,935,311.81	7,369,446.19
Aviation stations, seacoast defenses	8,000,000.00	1,709,591.48	6,290,408.52
Increase of compensation, Military Establishment, 1919	89,337.99	137,545.62	48,207.63
Inland and port, storage and shipping facilities	734.42	734.42	
Aviation seacoast defenses (no limit)	63,918.66		63,918.66
Signal Service of the Army, 1919	10,640.56		10,640.56
Grand total	107,469,389.63	93,783,183.33	13,686,206.30

AIR SERVICE (MILITARY) 1919.

1 Allotments.	2 Amount of appropriation or apportionment.	3 Classification of allotments.	4 Unallotted balance.
301. General equipment:			
Radio apparatus		$65,646.72	
Photographic equipment		64,189.36	
Communication equipment		139,865.43	
Camp equipment		352,550.22	
Machinery		541,089.94	
Tools		188,327.69	
Fire apparatus		76,063.81	
Furniture and fixtures		38,730.90	
Miscellaneous equipment		805,929.11	
Undistributed		2,381,097.62	
Reserved on interbureau requisitions		118,332.14	
Reserved on approved request for material		172,207.50	
Total	$6,000,000.00	4,944,030.44	$1,055,969.56
302. Transportation equipment:			
Motor trucks		48,367.27	
Tractors		68,933.40	
Trailers		32,416.00	
Touring cars		50,876.38	
Chassis		14,578.00	
Bodies		42,000.00	
Motor cycles and side cars		32,250.06	
Bicycles		223.56	
Miscellaneous vehicles, spare parts and sundries		232,101.84	
Undistributed		661,994.49	
Reserved on interbureau requisitions		746,006.04	
Total	2,000,000.00	1,929,747.04	70,252.96
303. Maintenance:			
Maintenance and repair of buildings		13,735.81	
Maintenance and repair of equipment		59,828.59	
Miscellaneous maintenance and repairs		80.46	
Undistributed		2,684,094.72	

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

AIR SERVICE (MILITARY) 1919—Continued.

1 Allotments.	2 Amount of appropriation or apportionment.	3 Classification of allotments.	4 Unallotted balance.
303. Maintenance—Continued.			
Reserved on interbureau requisitions		$2,889.10	
Reserved on approved requests for material		40,245.34	
Total	$3,500,000.00	2,800,874.02	$699,125.98
304. Purchase and lease of land:			
Camp and building sites		692,707.34	
Undistributed		761,811.81	
Reserved on approved requests for material		1,530,391.53	
Total	3,500,000.00	2,984,910.68	515,089.32
305. Construction of buildings:			
Coastal stations			
Border aero stations			
Balloon stations		174,000.00	
Depot, supply, repair		357,937.80	
Barracks, quartermaster, miscellaneous buildings		2,605,811.58	
Schools		1,977,014.02	
Flying fields		5,408,099.09	
Miscellaneous construction		802,994.51	
Undistributed		3,518,828.00	
Reserved on approved requests for material		2,870,794.97	
Total	14,300,000.00	17,715,480.57	*3,415,480.57*
306. Maintenance and operation in United States possessions:			
Seacoast defenses, Panama Canal		41,096.54	
Seacoast defenses, I. P., Hawaii		20,321.01	
Seacoast defenses, I. P., Philippines		137,710.31	
Undistributed		79,439.78	
Reserved on interbureau requisitions		9,339.70	
Reserved on approved requests for material		224,509.73	
Total	354,758.00	512,417.07	*157,659.07*
307. Maintenance and operation of schools:			
Flying fields		49,203.01	
Schools		218,469.47	
Vocational training		60,983.62	
Undistributed		2,645,243.13	
Total	4,700,000.00	2,973,999.23	1,726,000.77
308. Pay, subsistence and traveling expenses of Reserve Corps, civilians, and students:			
Civilian employees		1,061.33	
Reserve Corps		1,500,016.67	
Undistributed		4,867,081.48	
Total	7,800,000.00	6,368,109.48	1,431,890.52
309. Experimental and research:			
Miscellaneous investigations		59,702.81	
Photographic equipment and supplies		5,069.51	
Undistributed		326,844.46	
Reserved on approved requests for material		545.00	
Total	450,000.00	392,161.78	57,838.22
310. Miscellaneous expenses and supplies:			
Office supplies		78,245.20	
Photographic supplies		582,325.55	
Printing		50,422.62	
Publication		17,213.70	
Services		146,034.21	
Miscellaneous supplies		451,952.89	
Undistributed		3,615,085.70	
Reserved on interbureau requisitions		12,357.80	
Reserved on approved requests for material		68,282.99	
Total	5,700,000.00	5,021,920.66	678,079.34

Director of Finance—Air Service funds—Statement of transactions as of June 30, 1919—Continued.

AIR SERVICE (MILITARY) 1919—Continued.

1 Allotments.	2 Amount of appropriation or apportionment.	3 Classification of allotments.	4 Unallotted balance.
311. Foreign expenditures:			
Miscellaneous expenses and supplies		$110.23	
Undistributed		45,761,429.50	
Total	$50,000,000.00	45,761,539.73	$4,238,460.27
312. Oils, gases, and chemicals:			
Gasoline		51,631.97	
Castor oil		80.00	
Gases		160,509.93	
Chemicals		3,463.35	
Miscellaneous gases and oils		71,067.13	
Undistributed		218,926.68	
Reserved on approved requests for material		24,442.05	
Total	1,000,000.00	530,121.11	469,878.89
Total Air Service (military), 1919	99,304,758.00	91,935,311.81	7,369,446.19
Aviation stations, seacoast defenses	8,000,000.00	1,709,591.48	6,290,408.52
Increase of compensation, Military Establishment, 1919	89,337.99	137,545.62	48,207.63
Aviation seacoast defenses (no limit)	63,918.66		63,918.66
Signal Service of the Army, 1919	10,640.56		10,640.56
Inland and port, storage and shipping facilities	734.42	734.42	
Grand total	107,469,389.63	93,783,183.33	13,686,206.30

STATEMENT OF TRANSACTIONS, FISCAL YEAR 1919.

Amount of appropriations (Treasury balance)	$107,380,051.61
Withdrawals from Treasury	64,927,612.88
Treasury balance June 30, 1919	42,452,438.76
Allotments incurred	93,783,183.33
Allotments paid	27,327,837.18
Balance of allotments unpaid	66,455,346.15
Summary as to the condition of current appropriations and analysis of apportionments	107,469,389.63
Allotments, June 30, 1919	93,783,183.33
Unallotted balance June 30, 1919	13,686,206.30

Mr. OLNEY. Of these total appropriations, amounting to about $1,250,000,000, can you roughly estimate what was returned to the Treasury, considering future salvage and sales of material not needed for aviation production?

Col. FICKEL. I can prepare such a statement, but I have not it offhand. I could do that in five minutes and make a rough statement, but I could not do it in my head.

Mr. OLNEY. It is generally supposed by Members of the House that of this enormous appropriation practically all of it was wasted, or a great deal of it was wasted and a good deal spent for no good purposes.

Col. FICKEL. My latest information on the amount remaining is about $110,000,000, which is in the general fund of the Treasury. That takes into account the $50,000,000 which was turned over to the Director of Finance to use as he saw fit for the use of other services, so that really the savings on the total appropriation amount to about $160,000,000.

Mr. OLNEY. With further returns to come in, probably, in the way of salvage.

Col. FICKEL. Including the actual money which is still in the Treasury unused.

Mr. LAGUARDIA. Of course, some of that will be recouped from what we get through the sale of surplus supplies.

Col. FICKEL. Yes, sir; there is approximately $90,000,000 worth of supplies which are still subject to sale.

Mr. LAGUARDIA. Colonel, the committee was especially interested to find out approximately the total amount spent for the purchase of fields, machines, equipment, pay of personnel, expert advice and commissions, and travel. Have you prepared such a statement?

Col. FICKEL. I have prepared a statement which contains that information.

(The statement referred to follows, marked "Schedule E":)

SCHEDULE E.

Expenditures from Air Service appropriations made since the declaration of war.

Purchase of fields:	
Air service, military, 1919	$1,172,497.29
Aviation stations, seacoast defenses	420,041.48
Total	1,592,538.77
Purchase of machines:	
Signal Service of the Army, 1917–18, act of June 15, 1917	15,283,669.38
Signal Service of the Army, 1918	3,869,837.07
Increase, Aviation Signal Corps, 1918, to June 30, 1919	354,843,211.42
Air Service (Production), 1919, to June 30, 1919	128,137,034.22
Air Service, Army, 1920, to November 30, 1919	1,974,161.99
Total	504,107,914.08
Purchase of equipment:	
Signal Service of the Army, 1917–18, act of June 15, 1917	1,456,004.87
Signal Service of the Army, 1918	63,326.05
Increase, Aviation Signal Corps, 1918, to June 30, 1919	109,686,713.30
Air Service (Production), 1919, to June 30, 1919	6,608,152.97
Air Service, Military, 1919, to June 30, 1919	6,873,777.48
Air Service, Army, 1920, to November 30, 1919	31,622.78
Total	124,719,597.45
Pay of personnel:	
Signal Service of the Army, 1917–18	95,411.23
Signal Service of the Army, 1918	1,468,884.65
Increase, Aviation Signal Corps, 1918	3,385,499.39
Air Service (Production), 1919	11,731,007.85
Air Service, Military, 1919	4,868,062.81
Air Service, Army, 1920, to November 30, 1919	7,004,226.92
Total	28,553,092.85
pert commission:	
Increase, Aviation Signal Corps, 1918	810.46
Air Service (Production), 1919	98,500.00
Total	99,310.46
t advice, Air Service, Army, 1920	10,000.00

Travel, etc.:
Signal Service of the Army, 1918
Increase, Aviation Signal Corps, 1918, pay of Reserve Corps and traveling expenses
Air Service (Production), 1919, payment of mileage
Air Service, Military, 1919, payment of Reserve Corps and subsistence of students
Air Service, Army, 1920, traveling expenses of civilians

Mr. LaGuardia. In addition to what is contained in in order to have a comprehensive statement before us, we what was allowed for purchase of equipment and traini which amounted to what?

Col. Fickle. Approximately $139,000,000.

Mr. Fisher. Colonel, are you giving your judgment as or not the money that you have outlined here was wise by those in authority?

Col. Fickel. Judged from the viewpoint of the peo pended it, from the best knowledge which they could p at the time the money was spent, I believe it was ver pended.

Mr. Fisher. Have you given in the record thus far a s to whether or not the Air Service as conducted during th have been more efficiently conducted if there had been Air Service?

Col. Fickel. As a matter of fact, during the war the was conducted as a separate Air Service.

Mr. Fisher. Throughout the war it was practically a s Service with an aircraft board that had control over the which made it the same as a separate Air Service.

Col. Fickel. To all practical purposes.

Mr. Fisher. Your recommendation now is—is it n prevent our Air Service from becoming absolutely stagn perfect a constructive measure in the shape of a separat ice.

Col. Fickel. It depends on what you mean by a s Service. I can conceive of two separate Air Services, on branch of the Army, a separate branch of the Navy, branch of the Post Office Department, and perhaps of ment of the Interior, all coordinated by a Department tics. I can further conceive of a Separate Air Service sists of an entirely separate department, functioning s every way and standing off, making faces at the other do not believe that would be the proper solution. I be own mind, that a Department of Aeronautics which was latitude, under the President, to coordinate the various of the various departments would be the wise solution the President should have very great latitude in shifti from one of the established departments to another, a appropriations during the period of experimentation now carrying on.

Mr. Fisher. You are not in favor then of a officer?

Col. Fickel. I believe the head of this depa Cabinet officer in order to give him close access equal power with the heads of the other depart

Mr. FISHER. Then your recommendation would mean that with a separate Cabinet officer and a personnel under the Cabinet officer, and with the large number of administrative offices which would necessarily follow, and with the Navy, the Post Office, and the other departments, as well as the Army aviation, all concentrated under that one department, you would undoubtedly get under that schame a remarkable development probably in aviation itself in the way of improvements along technical lines, but I would like to have your opinion as to whether or not we would, at the same time, sacrifice coordination and cooperation as a fighting branch of the Army and the Navy.

Col. FICKEL. I think not, sir. I believe that if there is ever another war of the magnitude approaching the one that is drawing to a close now, aviation will be of equal importance with the Army and Navy, and that the part of the aviation department, which works with the Army or which works with the Navy, will be a very small part of the aviation forces of the Government. I believe that the aviation forces will gain the first contact with the enemy and will be almost decisive in their results in paralyzing the industry of the enemy's country. I think that the part that aviation plays in the Army is almost a minor rôle.

Mr. HULL. Colonel, I would like to ask you a few questions. I notice under purchase of machines, $504,000,000.

Col. FICKEL. Yes, sir.

Mr. HULL. How many machines did you get all told?

Col. FICKEL. I could not say offhand; sir. That information is available, and I think that it is in the hearings already, as to the number of machines purchased.

Mr. LAGUARDIA. That would include training machines of all kinds?

Col. FICKEL. Yes.

Mr. HULL. What would be the average cost of a machine. Could you give me approximately those figures?

Col. FICKEL. The average varies for different types. Training machines averaged in this country $4,600.

Mr. LAGUARDIA. That is without the motor.

Col. FICKEL. Without the motor, and the motor was $2,500 more for the training machine.

Mr. LAGUARDIA. Mr. Hull, we have a witness here who will give you all that information.

Mr. HULL. That is about the cost I had in mind, and I can not understand, if we spent $504,000,000 for the purchase of machines saying the average price was $10,000 per machine, why we have not about 50,000 machines.

Col. FICKEL. The average was probably higher than $10,000.

Mr. HULL. For training machines and all?

Col. FICKEL. Including training machines and all. There were some machines which were purchased, and which came as high as $75,000. Included in that also is the cost of engines, and they were expensive.

Mr. HULL. That would be purchase of equipment, would it not?

Col. FICKEL. No, sir; the equipment we carry separately. You asked for machines and equipment separately.

Mr. HULL. Then, in the purchase of machines you include all the expense on engines.

Col. FICKEL. All expense on airplanes and all expense on engines, and all expense on balloons.

Mr. HULL. I do not see why you should say purchase of machines and then include other items.

Col. FICKEL. That is a part of the item. I can give you that separately if it is desired.

Mr. HULL. I do not know whether you can give it to us or not, but I would like to know how much we actually paid to manufacturers for machines.

Col. FICKEL. What do you mean by machines, just the airplanes alone, the bare airplane?

Mr. HULL. The bare airplane.

Mr. LAGUARDIA. Mr. Hull, I will say that you will remember that we passed a resolution asking for an inventory, with the prices paid for each machine and each motor, and the number of each type of machine and each type of motor. We passed that resolution in August and they are still working on that. They did not know what they had on hand and it has taken a long time, but we hope to get that now very soon.

Mr. HULL. We ought to have that because it is very interesting to know, if we have paid out all this money for machines, why we have not some of them around somewhere, and we are informed that we have not any.

Mr. LAGUARDIA. We have a lot of training machines.

Mr. HULL. They say they only cost about $3,000. What became of the good machines that they paid such big prices for. Those are the things we have got to know before we get through.

Col. FICKEL. The actual expenditures for airplanes and the spare parts which belong to the airplanes were approximately $189,495,000 in this country. That does not take into account foreign expenditures, because we have not yet received the records from the American Expeditionary Forces.

Mr. HULL. You do not know how much was spent over there?

Col. FICKEL. Yes, sir; approximately $139,000,000.

Mr. HULL. Spent over there?

Col. FICKEL. Yes; that includes expenses of training and expenses of purchase of airplanes, engines, construction of cantonments, and production centers.

Mr. HULL. Of course, that will all come out, I suppose, before another committee that is investigating that matter, and I do not suppose we need take up our time with it.

Mr. LAGUARDIA. I think the only time when we will ever get that information will be when we get this inventory which we have asked for, and that is a gigantic task, because they did not have the records.

Mr. HULL. It ought not to take long to make an inventory if we have not got any on hand, and they insist that we have not.

Mr. LAGUARDIA. We have asked for information as to everything they have.

If there are no further questions, we thank you very much, Col. Fickel.

STATEMENT OF COL. C. G. HALL, AIR SERVICE.

Mr. LaGuardia. Colonel, you are a Regular Army officer?

Col. Hall. I am.

Mr. LaGuardia. How long have you been in the service?

Col. Hall. Twenty-seven years.

Mr. LaGuardia. And your present assignment is what?

Col. Hall. I am the Chief of the Procurement Division and Chief of the Material Disposal and Salvage Division of the Air Service.

Mr. LaGuardia. Just explain to the committee the functions of the Procurement Division and also your other division.

Col. Hall. The Procurement Division is charged with the procurement of all air-service supplies, whether it be by manufacture, purchase, or transfer from other activities of the Government, with the making of all contracts and other activities incident to the procurement of supplies, such as the investigation of patents, the securing of patents, etc.

Mr. LaGuardia. Have you a prepared statement?

Col. Hall. Yes, sir.

Mr. LaGuardia. We will be glad to hear you,

Col. Hall. I am submitting you in written form, which I shall read before you, an expression of my views of the aircraft situation, in so far as it comes within the purview of my experience and, particularly, in so far as that situation affects the production of aircraft equipment.

For your information I desire to state that, as the Chief of the Procurement Division of the Air Service since March, 1919, it has been encumbent upon me to not only carry on the routine activity of procurement, but to look forward into the future with the view of influencing organization to such extent as might be necessary to insure economical and expeditious acquirement of aeronautical equipment, both in peace and in time of war.

In so doing, necessarily, I have been guided by my own experience, which, during the war, was technical and applicable almost entirely to the question of supply, and which, because of a number of years of activity in the War Department in general, along a technical business line, has somewhat fitted me, by virtue of such experience, to visualize the problem.

I do not speak from the viewpoint of a flying officer, nor do I speak from any particular experience gained from the standpoint of a flyer, except, in so far as I have visualized this factor to a considerable extent as an observer in experimental flights, but I do speak from the standpoint of production in so far as this feature may be vital in the procurement of aeronautical equipment of adequate design for timely use of existing flying tactical organizations.

In making my statements before the committee, I do so only after having considered, primarily, the question of procurement from my own experience and after a careful perusal of reports and statements made by the various advocates of one system or another for the successful carrying on of an Air Service for the country.

I do not desire, in making this statement before your committee, to attempt to go into the various arguments which have been pre-

sented in one way or another as to the ways and means to accomplish results in aviation, either civil or military, or both, but I merely desire to state to you, as the result of my observation and experience from a production standpoint, that there are certain vital fundamental factors which must be considered in efficiently producing aircraft equipment and in economically manufacturing this equipment, both in peace and in time of war.

The production or manufacture of all articles of equipment, of whatever nature, and the maintenance and repair of such equipment, involve, essentially, questions which pertain to industry, and it goes without saying that to attempt to produce equipment or to maintain it without personnel of industrial and business experience will be to invite inefficiency and failure.

On the other hand, the procurement of aircraft equipment for the Government and its maintenance while in service is not identical with similar questions in industrial life; for there is always, in governmental matters, a question of military or departmental necessity, which does not always coincide with industrial economy and efficiency.

It therefore seems to me that the question of production and maintenance, while essentially a question of industrial technique, based upon business principle, can not be satisfactorily administered except after the closest coordination with the military, naval, or other departmental administration, the successful carrying on of which is the measure of departmental success.

It is a principle that quantity production is cheaper per unit produced than production in small quantity, and, therefore, if all governmental aircraft can be produced under one activity, economy must prevail.

It is also believed that to maintain aircraft equipment properly a degree of skill is necessary which can not be obtained in the enlisted man in time of peace, and in time of war, due to confusion and lack of time, while this degree of skill may exist, it can not be properly segregated and coordinated.

It is, therefore, my belief that maintenance of aerial equipment should be divided into two classes, i. e., minor or field maintenance, and major overhaul. Minor or field maintenance can and has been successfully carried on by troops in field, but major overhaul is believed almost never to have been successfully and entirely carried on by troops. It is my experience that the Government can not and does not economically operate or produce, and for this reason should eliminate the operations in connection with maintenance, as far as practicable, requiring such maintenance to be performed in industry where major repairs can be best and most satisfactorily made and the articles returned to troops in the field with the knowledge of repairs which may be depended upon.

If it be admitted that the Government can not operate or produce economically, then it goes without saying that the Government should not attempt to manufacture its aeronautical equipment, yet a certain supervisory organization becomes necessary in questions of production and maintenance or equipment for the Government, and this supervisory organization must, necessarily, be composed of the proper proportion of men experienced in military matters and of

men thoroughly trained in the technique of industry gained only by the gruelling competition which is met with in business life.

Whether aeronautical equipment be produced under the supervision of an Air Service under the War Department, or whether it be produced under the supervision of the proper officials of a department of aeronautics, one thing I am thoroughly convinced is necessary, and that is, the officials charged with the production and maintenance of Air Service equipment must be unlimited in all authority effecting the ways and means necessary to carry on production and maintenance, and shall only be limited in such authority in matters of major policy, which should be decided upon in close coordination with the military or departmental program.

It is my belief that much greater freedom than now exists must be given the official charged with aircraft production in obtaining skilled personnel and in the question of discharging unsatisfactory personnel. It is my belief that efficiency can not be obtained by civilian personnel employed under the present rules of the Civil Service Commission, and that, unless these limitations be relaxed by adequate legislation in the matter of aircraft production, future procurement of aerial supplies for the Government will meet with the same degree of inefficiency and delay as existed during the past emergency.

It is my belief that the best results can be obtained by a separate department of aeronautics, charged with the functions of organizing aerial tactical units and in their elementary training, in so far as the technique of flying is concerned. Their tactical training, however, should be under the War or other departments where such organizations, when organized and trained in their technical flying training, will receive service instruction in coordination with the field organization of the military, naval, or other departmental activities. I believe, by a separate department of aeronautics, a common procuring agency may be established, such as will function for all activities of the Government, but in such department of aeronautics there should be a separate activity or division for each department concerned, charged with the organization and training of the units especially applicable to the several services of the Government. I believe there should also be in the department of aeronautics a special department of research and investigation, represented by all departments of the Government interested in aerial activity, but limited in its powers of investigation and research, generally, to that of supervising developments made in industry, so as to adapt such developments to the particular necessity of the several departments concerned.

I believe the department of aeronautics should be charged with the segregation and storage of all supplies needed for the department of aeronautics for its own operation and for the operation of all aerial organizations serving in the field, whether military or civil, except after such supplies shall have been placed in possession of such organizations serving in the field.

In the present state of the aircraft industry, it seems to me that it is a necessity that such aeronautical supplies as may be necessary for any programs of the Government be allocated to the existing industrial manufacturing plants in proportion to their plant

facilities, and that the present law, requiring competition between such activities, be modified so as to permit these requirements to be waived to the extent necessary, so as to effect allocation, as stated. If this be not permitted the effect will be, that those manufacturers who may not be successful in their competition to obtain contracts from the Government will be forced, of necessity, to liquidate, thus, gradually reducing the manufacturing concerns organized to manufacture aeronautical equipment to such an extent that the Government will not be able to obtain production in quantity in an emergency.

I wish to urge upon the committee the vital necessity of adopting a policy of appropriations, of whatever extent, continuing over a period of years, so that the manufacturers engaged in the production of aeronautical equipment may visualize ahead of time the amount of work which will be available for the entire industry, and upon which they may base their plans from year to year. Continuity of production is essential to success in the manufacturing business, and if the Government can not guarantee such continuity of production by appropriations continuing over a number of years, it must expect, by the policy of spasmodic appropriations, to pay dearly for its equipment when manufactured.

I also wish to urge upon the committee the necessity of encouraging engineering development by the appropriation of adequate amounts of money therefor, and, especially, by incorporating in the law making the appropriations, a proviso for the offering of rewards to engineers and engineering organizations for the production of successful approved designs for aeronautical equipment. It is my belief that the greatest development in engineering design will come from industry, and, unless industry be encouraged by the Government, this particular factor will languish and our engineering development will not go forward or keep pace with that of other Governments.

I would be glad to answer any questions, Mr. LaGuardia, explaining why the total costs of aircraft and aircraft equipment appear to exceed what the unit cost might be.

Mr. LaGuardia. We would like to hear you on that.

Col. Hall. Shall I make a general statement?

Mr. LaGuardia. Yes.

Col. Hall. Col. Fickel, just testifying, has stated that the cost to the Government was something like $500,000,000 for airplanes. He subsequently modified his statement, that this included the cost of engines and accessories. I wish to invite the attention of the committee to the fact that when we entered this war we had practically no facilities for the manufacture of aircraft. There were, in a small way, several organizations, the output of which would not have been commensurate in the slightest degree with giving us an adequate supply of airplanes and engines. It became necessary, therefore, to go into industry develop facilities, plant facilities, places to make planes and engines, and it must be recalled that not only airplanes were needed but everything else for the prosecution of war, ordnance, raw materials, tools, special tools, so that the entire industry was flooded with demands for plant facilities, all of which had to be enlarged.

There was but one way to do that, and that was for the Government to put up the money to enlarge these plant facilities. In some

cases the Government built the plants, and in other cases the Government advanced the money to manufacturers to build the plants, and subsequently sold to the manufacturer on an appraised value the increased plant facilities which became necessary for the production of the equipment. Now, in the item of cost to the Government of producing airplanes and airplane engines, and airplane accessories, the extraordinary items of expense were those items involved in building extensions to plants, in building new plants, in tooling up those plants which, while I have not the figures at hand, I believe will be in excess of the cost of the actual airplanes and engines turned out. Had the war continued, this extraordinary expense, which we may call overhead, would have been carried over a larger number of airplanes and a larger output, and the relative cost of the airplane would have dropped down, but our antagonists did not see fit to hold out any longer and of course we had to pay the bills, and it looks large.

Mr. LaGuardia. Was that based on the cost-plus plan?

Col. Hall. It was largely based on cost plus and in some cases on flat rates. I may say in connection with the cost-plus plan that I think it is very pernicious, but I believe that at the time we entered upon this scheme it was practically impossible to get production otherwise. The manufacturers did not know the cost of making airplanes and airplane engines, and they could not give a price. They did not have the slightest idea what these articles would cost, and if they had bound themselves under bond to produce at a price that was too low, they would have gone broke, and if the Government had allowed them a price which was too much, they would have made enormous profits. On the other hand, I think that the cost-plus system was very uneconomical and I think we should get away from it and never go back to it.

Mr. LaGuardia. And it is the condition that existed at the time of the war and the enormous cost of production upon which you base your argument that we should develop this industry and keep it going, so that we will not meet the same conditions again.

Col. Hall. That is my idea, but predicated upon the belief that as time goes on this special industry will become a commercial industry, at which time I would say for the Government to get out of the business and buy our airplanes then by competition, if necessary. That is the economical way to buy, I will admit, but we can not do it to-day.

Mr. LaGuardia. We thank you very much, Colonel.

UNITED AIR SERVICE.

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., December 9, 1919.

EVENING SESSION.

The subcommittee reassembled, pursuant to the taking of recess, at 7.30 o'clock p. m.

STATEMENT OF MR. HALSEY DUNWOODY, OF NEW YORK, N. Y.

Mr. LAGUARDIA. What is your name and address?

Mr. DUNWOODY. Halsey Dunwoody; 43 Exchange Place, New York City.

Mr. LAGUARDIA. What is your occupation?

Mr. DUNWOODY. I am with the Finance and Trading Corporation.

Mr. LAGUARDIA. You were formerly in the United States Army?

Mr. DUNWOODY. I was formerly in the United States Army.

Mr. LAGUARDIA. For how long?

Mr. DUNWOODY. I graduated from West Point in 1905.

Mr. LAGUARDIA. When you resigned from the Army you held the rank of full colonel?

Mr. DUNWOODY. Colonel in the Air Service.

Mr. LAGUARDIA. You were professor of physics at West Point, were you not?

Mr. DUNWOODY. No. I might say if I have a profession, I am an engineer by profession, as I took an engineering course in a college, in addition to West Point, and spent seven years at West Point as assistant professor and acting professor of mechanical engineering.

Mr. LAGUARDIA. Colonel, you served overseas during the entire duration of the war, did you not?

Mr. DUNWOODY. Yes.

Mr. LAGUARDIA. To what duty were you assigned?

Mr. DUNWOODY. I left West Point in October of 1917, and went over with what was then the Aviation Section of the Signal Corps and arrived in France in November. On November 17 I arrived at headquarters in Paris, and on November 18 I was put in charge of the engineering division of the Air Service as it was then constituted, called the Technical Section.

Shortly after I arrived Col. R. C. Bolling, who was acting as chief of the Air Service line of communications, was charged by the chief of the Air Service with negotiations with the foreign governments. That position had been held by Col. Bolling since his arrival with Gen. Pershing in the summer of 1917.

Cumulatively I held the following positions: I was made a member, with Gen. Foulois, of the Interallied Aviation Commission. Later I was again appointed with Maj. Gen. Mason Patrick, who relieved Gen. Foulois as Chief of the Air Service. That Interallied Aviation Commission met in Paris once each month, and the members of that commission included the air ministers of the allied nations, and the men generally who had charge of the business of air-service production, supplies, etc. I consider that my experience at those meetings was probably the most valuable background that I can think of in the consideration of this problem of development in the organization of the Air Service, because we saw there worked out from month to month under the strain of emergency the evolution of the problem which is now before you.

We saw the representatives of the different allied nations struggling with the same problems that are mentioned to-day, and each with its own personal equation, and each of which attacked its problems and solved them in its own way, and the tendency, based on experience, was all in one direction.

Later, I was charged with the responsibility for the supply of the Air Service, and the question of supply at various times meant the organization and the administration of the subdivisions of production, maintenance and transportation, the receipt of material at the base ports, the shipment of that material to the base depots, and the redistribution to the advanced depots and the Armies at the front. I was later made assistant chief of the Air Service, and the Air Service representative with the Liquidation Commission after the close of hostilities during the period when we were negotiating for the sale and disposal of our material in France. I might add that later on I was made a member of Mr. Crowell's Aircraft Association when it reached the other side.

The responsibility which fell to me I took at a time when the United States Air Service did not have a single service plane and when the personnel of that end of the Air Service was, in round numbers, some 20 men. I kept that responsibility until July of 1919, operating at the same office and the same desk until the organization amounted to about 35,000 men, and we had 45 squadrons in the war area. That organization had to be created, adjusted, coordinated, and administered at the same time. For that reason I feel that the experience that came to me put me in a position to view this matter along more or less broad lines.

It is hard to realize the enormity of detail and the complex nature of administration of such an organization. It is one that is not military in any sense. I brought with me when I came to this service, not knowing just what I went overseas for—very few of us did—a military training, a West Point training. I had served in a good many different capacities in the Army and was familiar with the regulations and understood the interior mechanism and the ways and means by which things are accomplished in the Army. And i

I might digress, I think I can bring out a point by telling a very simple narrative.

The first six weeks after we got to France we started to organize what we thought was needed to obtain the necessary aviation material so that our Army would be equipped. It was very soon apparent that we would get nothing from the United States. We were in a foreign country, a country which was nearing its fourth year of war, where there was a lack of raw material, where the labor problem was one which was unsolved, and yet it was absolutely necessary to overcome those difficulties and get material if our Army was to be equipped with any planes at all.

I tried, along the lines of my experience when this job fell to me, to work it out according to the blue book. I knew where military papers ought to go, I knew what would happen to me if I did not send them through the proper channel. I struggled with this thing for six weeks. I can very well remember sitting up until 3, 4, and 5 o'clock in the morning with this little band of volunteers, you might say, struggling with these problems all the time, and yet all the time feeling that we were not getting anywhere. After that had been going on for a good many weeks, I remember one evening a friend of mine came to the office and suggested that I go out to dinner with him. I felt that I could not spare the time, but he insisted that if I did not get away from that thing I would go crazy, so I went with him. At that time the situation was more or less desperate. The morale was low, and in the French nation there was no feeling that the American Army would really develop into a force to be counted on, and the French were naturally reticent about turning over to us the material which they needed so badly.

We had a very enjoyable dinner, and I remember that some time in the course of that dinner—I do not know whether you would call it an inspiration—an idea occurred to me, and that idea was to take things in hand and more or less make the decisions on these various details; and that very night I presented this matter to the Chief of the Air Service, and with his permission—he told me to go ahead.

The next morning in the office I called in the members of this small organization, the heads of the different subdivisions, and I expressed to them that view and told them that from that time on, with the permission of my chief, the decisions would be rendered as nearly as possible then and there. I mention that because that was the foundation of such success that we had, and it was in reality a central control.

With that central control we found we could get things done. With the mechanism which was created at that time it was impossible to get things done. There was a General Staff, and the members of the General Staff were busy, all the committees of the General Staff were busy. There were no men on these committees who understood the problems of the Air Service, and when these problems were presented the importance of them was not manifest, and it was almost out of the question to get any sort of a decision which would enable us to do business.

As a result of this central control, under the supervision of the Chief of the Air Service, we were able to negotiate with the French

Government the basic contract of May 3, which resulted in the furnishing of the aviation material to the American Army in quantities sufficient to meet the General Staff program until such time as the aviation started to come from America.

I think that one fact is important because you gentlemen know what occurred on the other side, where there was no central control. There is no question but what the money was available; more than $1,000,000,000 was spent, and we had the best brains of the country, and yet it was not really until November 11 that the American material started to come through. The difficulties we had on the other side were enormous; the foreign relationship was such that we could not come to those people as we could come to the same sources of raw materials and supplies in the United States; and yet with the central control such as we had we were able to get from that source some 38 or 39 squadrons in about eight or nine months, and we were able to establish the depots that were necessary.

I would speak particularly of one thing: At Romorantin there was a depot created for the salvage of planes, which was three times as large as the Ford factory in Detroit, which was built and equipped and running nine months after the first plow struck the ground, with 12,000 mechanics at work in the depot. I do not believe it would have been possible—I know it would not have been possible without some centralization of control to accomplish those things, and I am quite sure that without central control the same things could never be accomplished in any emergency.

Mr. Chairman, I have prepared no statement; I have made just a few notes, to which I would like to refer.

There is one thing about this supply of aviation material which is not generally known, and that is that the program of material required for our Army in France was met fully. I remember one telegram from Gen. Mitchell toward the end of the first Chateau-Thierry drive, which said, "Do not send any more planes; the push is over." I mention that as an illustration alone the line we have been talking about.

Mr. LaGuardia. Of course, that was material that they acquired over there?

Mr. Dunwoody. That was material that they acquired in France under the general system which I have outlined.

There is another feature I would like to emphasize, and that is the great importance of this present problem. I believe it is conservative to say that upon your decision may rest the destiny of this country. I say that because in the opinion of the men who have had most experience in military matters, in the next war the nation will win that gets control of the air. If you could stop a moment and realize where aviation started at the beginning of hostilities, say, five years ago, and compare the development of that weapon with any other military weapon, you can see the possibilities of the development in the near future.

There is one important thing to be considered in this connection, and that is that while we had one mind working on aviation development in those days, there are thousands of minds working along the same line to-day, and it is reasonable to suppose that the development will be greatly accelerated rather than checked by peace. I say

development because the research men have time now to apply to study and research in connection with this problem. While the production of airships themselves has fallen off, and will fall off, that research work and development work is bound to go on. With all these experts thinking along those lines, there is no telling what the future has in store in the way of aviation advancement.

It is certain also that in the came of another emergency arising the nation that gets control of the air will be the nation that is ready. In this war, when aviation started practically at zero, it was more or less of an aviation race. The Germans would be ahead for awhile and then the Allies would overcome them and the control swung back and forth, and neither side ever gained complete mastery of the air. In the next war it is bound to be different. In America already the entire production has fallen to a point where it is negligible. It is rapidly becoming a lost art. It would have to be built from the ground up.

In the foreign countries that is not so, especially in England, as has been brought out in testimony before this committee. England was closer to the war zone, and London had a good many bombs dropped on it. The English people found that there was a new route to the British Isles, and in the words of their air minister, they are preparing an air development which will be second to the navy for awhile, but as he says, the possibility is that it will outstrip in appropriations and effort the present English navy as the fundamental source of protection for the United Kingdom.

In England the distances are so small that it is almost impossible to develop commercial aviation. They are going ahead with it. however, and as you know they have laid expensive plans for routes to France and to their own colonies. America is an ideal country for the development of commercial aviation. Our distances are great, there are hardly any sections of the country where landing fields can not be had, and it is only reasonable to suppose that this new asset of civilization will certain be utilized.

It has been said by one authority that the development of the aviation art will, as a matter of fact, be a barometer, it will indicate in a measure the Nation's measure of progressiveness.

There are two or three things which I think should be always kept in mind in considering an organization of the air service for the future. The first is one which we always have with us, and that is the question of economy. Under the present system there is a repetition of engineering development, of purchase, of disbursing, and of the organizations necessary to administer aviation in each branch of the Government. There is then duplication in each case.

There are specialized fields of each branch of the Government where aviation is used where there is no duplication, but in general the entire work is duplicated and the industry is approaching the same problem through three or four representatives of the Government, and in almost every case they get three or four separate and distinct answers. We had an example of this in our actual experience in the American Expeditionary Forces, where our naval aviation was engaged in the development of bombing operations, working with the English, where they were required to obtain material as we were, or attempt to obtain it in Italy. In the negotiations with the repre-

sentatives of the Italian Government we were surprised to find ourselves in competition in a European country with our own representatives. We were each trying to promise the Italians more than the other fellow so we could get one or two Capronis away from him. This condition, when it came to light, of course, was adjusted, but at the same time it is a definite example of what is bound to occur where you have the same problem handled by three or four different executives.

The same occurred in England. In the early part of the game in their service competition was so keen that in some of the English manufacturing shops certain allotted sections of the factories were given over to the navy and others to the army, and I was told by the gentleman who was responsible for the production and supply of the British air ministry that things reached such a stage that when the army needed the stuff and the navy machines were idle they could not use them because they belonged to the navy. Those were matters that came to a final adjustment.

There are other things which demonstrate this same duplication of effort and lack of coordination in the several branches of aviation even in the one service. There is one very important matter which should demonstrate this. In France the production and supply end of aviation was more or less subject to the control of the department of engineering. In 1917 and the early part of 1918 there were probably 15 or 20 different types of aviation engines being manufactured in France, and for the life of me I could not find out which engine was the best engine for the different uses, and which engine would be produced in sufficient quantities, so that we could count on it as a source of supply.

The reason naturally was that the technical end of the game was so powerful that they controlled production. An engine would be put in a shop to be made and before it could be completed some change would occur and the production would be stopped. This same thing to a lesser degree occurred in England, but in both countries it was corrected. In France it resulted in M. Clemenceau placing control in the hands of a man with instructions to pick out five engines and make those engines and let the others go. In England it resulted in making a definite set of rules which controlled the changes which would be made in aviation material that was already in production. Until you have a boss who can view the entire field and size up the relationship of one branch of the work as compared with another there will always be such confusion of effort. I can not conceive of any industry or business as complicated as this one is being run without some final authority to say yes or no. I think what we have been through proves that better than any verbal testimony which can be given.

If we stop to consider the legal talent which has been used and the investigations that have been conducted by Congress and by individuals especially appointed, we can see how hard it is to find a man who is responsible for what is wrong. I do not believe they have found out yet, and if you can not find that man with the legal talent that has been working on the case, I ask you how you can expect a business man in the industry to do business with such an organization.

The industries affected by this business cover almost the entire field of the United States. It takes upward of 25,000 items to equip an maintain an air-service squadron on the front. Somebody has got to give some thought to each one of these items. Some business man is interested in each one of those items, and in order to assemble them and to turn out a unit it is necessary to have some authority who can say yes or no without referring the matter to a board or a committee or some other body that does not know anything more about the business.

It seems to me that the crux of this whole situation is to provide an organization headed by a man, an authority, whom Congress and the people can hold responsible, and I think if that is done Congress and the people would get what they want in the matter of aviation, and until that is done I think we have had proof enough that they will never get it.

If there are any questions I can answer, I will be glad to try to answer them.

Mr. HULL. I should judge from what you say that you are in line practically with the thought of most of the members of the committee in regard to the formation of a Department of Aeronautics. As near as I can find out, there is practically no sentiment anywhere against the formation or creation of a department of aeronautics. The only question is just how far we can go. There seems to be very little division of opinion in regard to that. There does not seem to be much question in regard to taking in research, engineering, and production in all the different branches of the Government and putting them under one head; but when you go beyond that there is some question. How far do you think it possible to go with this executive department we are going to try to form?

Mr. DUNWOODY. Mr. Hull, I think for one thing everything connected with the business end of aircraft should be in that department.

Mr. HULL. There is not much question about that.

Mr. DUNWOODY. On the other hand, I think everything should be under that department which can be administered economically by a single head without interfering with the military operations. I will explain what I mean by that.

I think the fundamental training of the personnel should be handled under the separate departments—that is, the ground work, the preparatory work—because you can cut out a lot of overhead, but you can get the essentials which are so necessary, no matter where a man may go afterward in his advanced training. I think the time will come—there is considerable argument as to the date—but I think the time will come when it will be necessary to have control under a separate Air Service. I think the time has come, if we can cast our eyes five years ahead, as well as five years behind, when the three elements of national defense must be recognized—the Army, the Navy, and the Air. The time never came in this war when the Army and the Navy got all the air material that they needed, but with the same organization and proper control it is easy to see the time when both the Army and the Navy will have all the equipment they want and when the production will be capable of going beyond that and creating a force which can be used strategically to the greatest advantage.

Mr. HULL. Up to the time of the armistice you never had any planes from this side for pursuit or combat work?

Mr. DUNWOODY. Not for pursuit work; no. We had no pursuit planes from this side and would have had none. We were counting on French production for the entire program of pursuit planes.

Mr. HULL. How many bombing planes did you have on the line on the day of the armistice?

Mr. DUNWOODY. As I recollect it I think about three or four squadrons; I think we had two groups.

Mr. HULL. American made?

Mr. DUNWOODY. Yes.

Mr. HULL. American-built planes on the line?

Mr. DUNWOODY. The first bombardment group.

Mr. HULL. Who was it on the other side who was responsible for the order that was sent to this side stopping the production of the Spad machines?

Mr. DUNWOODY. The responsible party was Chief of the Air Service.

Mr. HULL. Who was that?

Mr. DUNWOODY. My recollection is that Gen. Foulois was Chief of the Air Service at the time. It was about the time we got to France. It was in November, as I recollect it.

Mr. LAGUARDIA. I put in the record of the hearings on the Army appropriation bill the exact cablegram.

Mr. DUNWOODY. It was either Gen. Foulois or Gen. Kenly. I remember, in looking it up since, that it was around November 17.

Mr. HULL. What were the circumstances that justified that?

Mr. DUNWOODY. Things were changing rapidly and it was pretty hard to tell what was in another fellow's mind, but I think it was justified for this reason.

The pursuit plane is a plane which is made rapidly, it is a plane the type of which changes rapidly. At that time and subsequent to that time in the French aviation there was an element which went so far as to say the single-seater plane was a thing of the past, and that they were going to have two-seater fighting planes.

I was present with the aviation minister of France on an inspection tour at the front in one of the allied squadrons. Font was decorated that day and after the ceremony the pursuit pilots gathered around the air minister and laid down the law to him, because word had gotten in up there that the Spad planes were to be taken away from them. That was one of the things you can not follow because the whole element changes so rapidly.

Mr. HULL. It was a mistake; you realize that, do you not?

Mr. DUNWOODY. I am not so sure about that, for this reason. Had the development of the pursuit plane gone along the lines laid down, the Spad plane would have been so outclassed by the time it could have been made in America and put on the line that it would have been useless.

Mr. HULL. It was not outclassed by the time of the day the armistice was signed?

Mr. DUNWOODY. It did not happen to be because several planes they had counted on, and one of them they had in production of which they canceled an order for 6,000, fell down; but there was no way of telling at the time that they would fail.

Mr. HULL. The order for the Spad machines in this country was canceled at the time it was about to reach production in this country?

Mr. DUNWOODY. That brings up a very interesting point in regard to that matter, and that point is this, that it never should be said that an order for production was canceled in Europe. The reason why that order was canceled was because you had no single control here. You had no man who was driving all these horses, who could use his judgment, and get personally in touch with the men on the other side.

Mr. HULL. But the order came from the other side, where you had single control?

Mr. DUNWOODY. The statement of facts came from the other side, with a recommendation.

Mr. HULL. The absolute order came to stop it, as I recollect it.

Mr. DUNWOODY. The President of the United States is on this side of the water, and that is the end of the game in which, just as in any other thing, you have to use your judgment. It is perfectly proper and right that if a fault is found with an article, that statement should be made; but on this side of the water somebody has got to use judgment to continue that production and utilize it for another purpose, or to let these planes die out gradually. It has been the experience in all nations with aviation production that no production order ought ever to be cut off arbitrarily.

Mr. HULL. You spoke of cancellation; the De Haviland 4 was canceled.

Mr. DUNWOODY. No, sir; but it was held up, and on exactly the same line that I have just outlined. The De Haviland 4 came over there.

Mr. HULL. What do you think of the DeHaviland 4?

Mr. DUNWOODY. The De Haviland 4 of that type was a very good plane. There were some things that were objectionable, but they were all matters that would have been rectified.

Mr. HULL. It is only a bombing and observation plane, however.

Mr. DUNWOODY. It is only a bombing and observation plane; yes. We were working on the tanks over there, and they were also working on the tanks here, on the adjustment of the fireproof tank. Those things are a matter of evolution.

Mr. HULL. If we should create a department of aeronautics with a director who would have central control, and gave him the authority to control production and engineering work, and gave him control of all appropriations, and let him develop, so far as we could, his own department, would not that be about as far as you would advise us to go?

Mr. DUNWOODY. No, sir; I think you ought to put in that department every possible thing that can be put in.

Mr. HULL. You would put the primary training in there?

Mr. DUNWOODY. Primary training, the control of the separate air force and the training of the units themselves to the point where their training becomes specialized.

Mr. HULL. That comes right after the primary training, does it not?

Mr. DUNWOODY. The fundamental training is primary training. By primary training I mean training of the Air Service force to the time when it is to be assigned to special work. For instance, I

think the Navy spotter should be trained by the Navy, and the specialized training should be done by the services.

Mr. HULL. Operated by the services?

Mr. DUNWOODY. Specialized training. In the case of pursuit work, which is more or less the same, that is the defending of the observation and the bombing plane, it might be carried through so that the control would rest with the air force. Anything that can be administered by that air force which at the same time does not require a specialized knowledge which would make it adaptable to a particular service, I think ought to be controlled, for economic reasons, under a single head.

Mr. HULL. You would control practically the personnel of the air force?

Mr. DUNWOODY. I would control the personnel of the air force to the extent I mentioned; yes. Do not understand that I am expressing the opinion that the operation end, with the units, once they are assigned to the Army must necessarily be under command of the man who is operating; and the same thing is true so far as the Navy is concerned.

Mr. HULL. I think you are right, although there are several witnesses who testified that they think it could be operated separately.

Mr. DUNWOODY. When they are assigned to the Army or the Navy I think they ought to be under the Army or the Navy. But I think it is good business to utilize your machine to the fullest extent so that it does not interfere with the operations.

Mr. HULL. The exact details would have to be left largely to the executive department of aeronautics, to the Army itself. Do you not think it is almost impossible for Congress to lay down any rules on details?

Mr. DUNWOODY. I do not think it should touch the detail at all. The detail of that is the job for the man who is put in charge of it.

Mr. HULL. That is the way it seems to me.

Mr. DUNWOODY. I think the big thing is the thing I have mentioned several times, and that is to have a responsible authority, somebody you can call down here and put on the carpet, and who can not say that somebody else recommended it.

Mr. HULL. Central control and responsibility of a man who will work it out?

Mr. DUNWOODY. If he does not work it out the way it ought to be he will not last long.

Mr. LAGUARDIA. We have been through enough to know that we want a fundamental law creating a united air service; that is correct, is it not?

Mr. DUNWOODY. I do not think there is anybody in the country who will argue on that question.

Mr. LAGUARDIA. And when you create your fundamental law you create your department, your head of that department; we agree on that, do we not?

Mr. DUNWOODY. Yes.

Mr. LAGUARDIA. You would give by law the power to the head of that department to run his department?

Mr. DUNWOODY. He must have it; otherwise he is helpless.

Mr. LaGuardia. In this department you would also give power and authority by law to take jurisdiction over matters of production? I do not mean actual producing, but the acquiring of material.

Mr. Dunwoody. It goes further than that. In my opinion it should embrace every element of the business end of aircraft and also the commercial end of it.

Mr. LaGuardia. You would give this department jurisdiction over all the aerial activities in time of peace; that is, all aerial activities in the country conducted by the Government?

Mr. Dunwoody. Except the units operating as fighting or observation squadrons assigned to divisions or to the Army or to the Navy.

Mr. LaGuardia. We will come to that in a moment.

Mr. Dunwoody. In general; yes.

Mr. LaGuardia. That is, that department would take jurisdiction of the Postal Air Service, the Coast and Geodetic Survey force, and all that? You would give them, you say, control of the elemental ground training, the preliminary training?

Mr. Dunwoody. What we called primary training.

Mr. LaGuardia. As a matter of fact, is there any difference in the training of a man who flies a pursuit machine that fights in the air for the Army, or a man who flies in a pursuit machine and who fights in the air for the Navy?

Mr. Dunwoody. Fundamentally; no.

Mr. LaGuardia. So that there is no reason why that training could not be conducted under the United Air Service.

Mr. Dunwoody. Yes; that is the point I brought out, I think.

Mr. LaGuardia. When you talk about the Navy spotter and the observer who directs artillery fire, they are observers, are they not?

Mr. Dunwoody. Yes.

Mr. LaGuardia. So that they could be trained by their branch of the service and belong to the personnel of their respective branches of the service, but yet they would have to go to the United Air Service to be taught to fly in the air?

Mr. Dunwoody. They ought to get their fundamental, primary training under the air department.

Mr. LaGuardia. And then they should receive all their technical instruction for direction of artillery fire and Navy spotting from those branches of the service?

Mr. Dunwoody. It seems the logical thing.

Mr. LaGuardia. This war showed that our Army must have its observation squadrons.

Mr. Dunwoody. Yes.

Mr. LaGuardia. Without observation squadrons it is not safe for an army to move nowadays?

Mr. Dunwoody. It will be less so in the future.

Mr. LaGuardia. Then there is another function for it to perform, and that is to destroy the lines of communication of the enemy beyond the reach of artillery, and aviation can do that. Is that not correct?

Mr. Dunwoody. That is correct.

Mr. LaGuardia. After you have given your Army its necessary observation and artillery direction, then it becomes a part of the duty of the air force to protect these squadrons so that they can do their

work and to destroy the air fleet of the enemy so we can have supremacy in the air.

Mr. DUNWOODY. That is the biggest part of the procedure, outside of the purely strategical work.

Mr. LAGUARDIA. While we all agree that there must be a commander in chief of the Army in the theater of operations, if he has Navy troops fighting with the Army, he is also commander in chief of the Navy troops. The same thing holds true in regard to the marines if there are marines fighting with the Army, while all the big Navy guns operating on land would be manned by the Navy. So there should be a commander of the air force who operates under the command of the commander in chief. Is that not correct?

Mr. DUNWOODY. Yes.

Mr. LAGUARDIA. Now, then, suppose he gets general orders from the commander in chief to proceed to clear the air because they want to advance. Should not the method of fighting, the time of going, the formation of the pursuit squadrons, and the strategy they need to employ be left to the commander of the air force?

Mr. DUNWOODY. It should be left to the commander of the air force on the general staff or the commanding general of the air force.

Mr. LAGUARDIA. So that if you analyze it carefully all the Army or Navy really needs to have with them and under their complete control is the observation squadrons which operate with the troops.

Mr. DUNWOODY. I do not agree with you there.

Mr. LAGUARDIA. What else should they have?

Mr. DUNWOODY. I think that the operation of the units that are assigned to the Army and fighting with the Army in the field must always be subject to the orders of the commanding general.

Mr. LAGUARDIA. Absolutely; that is, in time of war.

Mr. DUNWOODY. Let me bring out a point there. The man you speak of as the commanding air general must know the tactics and the strategy and understand the movements of the other military units. It would be a mistake to have a man there who was trained only in the tactics of the air. In other words, that Army is a fighting machine that is coordinated in all its elements so that there can be never any question but what the Air Service that is there with the Army is a part of that Army and is subject in every way to the control of the man who is responsible for the success of that particular operation.

Mr. LAGUARDIA. That is true, and would that not also be true if in connection with this operation an attack by the Navy were necessary? Would not the commander of the forces on land, if the land operation was the major operation, be the commander, for the purposes of the operation, of that naval force assisting him? Would he not give the time and manner of attack and the calibers he wanted used?

Mr. DUNWOODY. He would probably leave that detail to his Navy commander, but if it was a part of his particular force he would be in command of the whole situation.

Mr. LAGUARDIA. Do you think it is necessary to give that commander any more power of control over the details of the air than you would give him over a cooperation with the Navy? That is what we are striving for.

Mr. DUNWOODY. Not at all. But it must be recognized that they are subject to the control of that one element.

Mr. LAGUARDIA. Absolutely.

Mr. DUNWOODY. The detail, of course, in this particular case, would be left by any general who would be in command of such an operation to the man who knew what he was doing, and if he did not know what he was doing they would get another man.

Mr. LAGUARDIA. For instance, after a general plan of bombing is agreed upon, the time and the method of destruction should be left entirely to the air force?

Mr. DUNWOODY. There is no question about it.

Mr. LAGUARDIA. Because we have been through the same thing, and toward the end of the war they were building up an independent bombing force.

Mr. DUNWOODY. In all the armies.

Mr. LAGUARDIA. So we could give them the other work under a united control, all the training?

Mr. DUNWOODY. All the training, with the possible exception of the very specialized work with the particular branch of the service.

Mr. LAGUARDIA. Just to clear up the record, was it not your experience, Colonel, that you spent a great deal of time and energy and effort in trying to establish cooperation and coordination with the authorities in the United States?

Mr. DUNWOODY. We used every means.

Mr. LAGUARDIA. Within reason and beyond reason?

Mr. DUNWOODY. I might say yes to that.

Mr. LAGUARDIA. Did you not go to the extent of calling up an officer and ordering him to take a ship on the spur of the moment to find out where a cablegram was?

Mr. DUNWOODY. We did, in many instances.

Mr. LAGUARDIA. You could not get a response always?

Mr. DUNWOODY. We apparently were out of touch with what was going on in the United States. That was a mystery which was never solved. The nearest solution to the problem was when Mr. Ryan came over himself and spent several weeks in the American Expeditionary Forces.

Mr. LAGUARDIA. Then he came back and the war was over?

Mr. DUNWOODY. Shortly after that.

Mr. LAGUARDIA. All your suggestions in regard to the packing of the De Havilands were constantly ignored, were they not?

Mr. DUNWOODY. I can not say what happened to the recommendations because we never knew, but we had some experiences which might perhaps be considered natural in the rush of business, but which were very unfortunate. I might say we had less trouble with the planes, perhaps, than some other things. They shipped over some of these steel hangars. They had all the uprights on one ship and the sides were on another ship. The uprights were on a ship that was torpedoed, and so we did not have any uprights. Those things are things which are bound to happen during a war.

Mr. LAGUARDIA. We shipped the De Havilands back in one box complete.

Mr. DUNWOODY. We were able to do it with a little experience in packing them, after we saw the effect of the journey on the ones that came over.

Mr. LaGuardia. Have you access to the reports and recommendations in regard to the necessary changes on the De Havilands and the motor made by Seeborn?

Mr. Dunwoody. The basic report on the De Haviland and on the Liberty motor was prepared, in the case of the Liberty motor, by a board which was sent to Romorantin, and, if I remember correctly, on that board were representatives of the technical service overseas, Mr. Hall and Mr. Marmon, who represented the United States end, and that whole thing was gone over very definitely and laid down in writing and was considered from every viewpoint. That was a final and authoritative report, which went back on the changes in the Liberty motor and the changes in the De Haviland 4's, and the report on that was made under the direction of the Chief of the Air Service by the Technical Section overseas and was sent after a cablegram was sent in which were enumerated the changes which had been made on those that came over.

Mr. LaGuardia. Were these the recommendations followed?

Mr. Dunwoody. I do not know. The changes were made on the De Haviland.

Mr. LaGuardia. The position of the tank was not changed?

Mr. Dunwoody. Not on the ships that came over, but I think they were working on them here.

Mr. LaGuardia. With the experience you had overseas you do recommend that immediate attention be given to the matter of the reorganization of the Air Service; you recommend that it be put under the control of one department to take in the various aerial activities of the Government, including all the development in our aeronautical industry in this country?

Mr. Dunwoody. Yes; and I would base that on the evolution that I have seen worked out with the same problem after the war experience in England, France, and Italy as being economical and being necessary so that the contact with the industry will be on a business basis. I think that is very important.

There is one other important item which I wish to mention in the matter of this development, and that is the synchronizing of the organization, the development of the organization; in fact, the development of material so that it can be utilized quickly in an emergency. The man who is responsible—and it is necessary to have such a man who is familiar with the general policy—should constantly keep in mind during the development of commercial aircraft which is bound to come, the possibility of utilizing the production, the mechanism, the personnel so as to be able to fit that into the emergency when it arrives.

I may say that the French now, in the type of plane which they are using to carry mail, have so arranged the mail bags that exactly the same holders which can take off the mail bag can be used for the bombs. That is an example of the point I am trying to make clear. The man who is responsible for this development will have fundamental principles of that kind in mind and will work to a definite end, whereas a committee control or some other joint control, split up, can never work along the lines of a definite policy. I think that is important.

Mr. LaGuardia. Did you have occasion to investigate the English system of a separate air service?

Mr. DUNWOODY. Yes; I worked with the English during the time they were evolving what became their organization after the war.

Mr. LAGUARDIA. How recently were you there?

Mr. DUNWOODY. I worked quite closely with the man who was responsible for almost all the elements we have mentioned in the production of the English air service, Mr. Arthur Duckam.

Mr. LAGUARDIA. How recently did you come into contact with that system?

Mr. DUNWOODY. I came in contact with that at the last with the American aviation mission.

Mr. LAGUARDIA. In what month was that?

Mr. DUNWOODY. I think that was in July or August.

Mr. OLNEY. Of this year?

Mr. DUNWOODY. Yes.

Mr. LAGUARDIA. Is their service functioning successfully?

Mr. DUNWOODY. Their service is functioning successfully. There had been an effort on the part of certain elements which do not agree with the central control idea to make it appear that the English system is not working. But our experience in talking to the man who knew most about this organization was that it was not only successful but it had been copied in the industry by certain of the controlling elements who had gone into this thing, backing it with their own money. The criticism originated in the dissatisfied elements which were taken in, and of course when a thing is done along the lines the British operate on, where you might say overnight the whole thing was gathered up and put in one basket, the meteorological service and everything else, it is to be expected that there would be some friction. That is something to be looked for. On the whole, the English system, in our opinion, is a great success and it will never be changed.

Mr. HULL. Did the Navy object to it?

Mr. DUNWOODY. The Navy objected to it in some particulars quite strenuously. But I believe those difficulties have been more or less eradicated. The Navy sees that with the present organization they can get what they want, both in material and personnel and they are coming around to the view held by the outsiders and the people who have organized the British Air Ministry.

Mr. LAGUARDIA. You have followed this up constantly since you were in the service, have you not?

Mr. DUNWOODY. I have been in quite close touch with it.

Mr. LAGUARDIA. And right after the armistice you caused a report to be made?

Mr. DUNWOODY. I have had so many reports that I could not say whether that was one of them or not. My headquarters happened to be in Paris. That was the first stopping point for all investigating committees, all investigating commissions and individuals who came over armed with credentials with the highest source, even during the war period, but more so after the armistice, and as I think back I can hear it almost as the endless waves of the ocean continually breaking over us. We generally saw the same parties on the way back before they sailed, after they had gone into everything.

The general opinion of those various investigating commissions and committees and individuals can be summed up, I think, in the

words of one very able investigator associated with a very renowned Senator when he said to me before he left, "I have seen this thing over here; it seems to be going, and it is astounding what has been done. At home everybody is working to the limit. What is wrong?" I would like to put on record to-night, after a good many months the same answer I gave this gentleman when the war was still on, and that is simply this: There is only one thing that is wrong at home, and that is that there is no boss.

Mr. LaGuardia. We are very much obliged to you.

(Thereupon, the subcommittee adjourned to meet to-morrow, Wednesday, December 10, 1919, at 10.30 o'clock a. m.)

STATEMENT OF LIEUT. COL. V. E. CLARK, AIR SERVICE.

Mr. LaGuardia. Colonel, what is your present duty?

Col. Clark. I am on duty at the Army Air Service Experimental Station, McCook Field, Dayton, Ohio.

Mr. LaGuardia. How long have you been in the Air Service?

Col. Clark. Six years and a half.

Mr. LaGuardia. I will state to the committee that Col. Clark is considered the highest authority in the United States on airplane designs.

Colonel, will you explain to the committee whether, in your opinion, the development of aviation in this country would be served by the creation of a united service; and will you also tell the committee whether there is any difference in the construction or in the general principles of design in naval or land aviation, or in fighting machines, and give us the benefit of your experience in the last six years?

Col. Clark. Referring to the first question, whether or not, in my opinion, the provisions for defense of the Nation would be benefited by a united air service, in the first place, I surely believe that the Air Service has no reason to be under the Signal Corps of the Army. If kept under the Army, it should be a separate branch of the Army, with equal prestige, I think, with the Infantry and Artillery. As to a united air service, separate from the Army, I believe that production of aviation equipment, including procurement, finance, and inspection of construction of airplanes, engines, and all equipment, should be controlled by one central board, or possibly, not a board, possibly just one man, who should handle production and procurement and inspection of aviation equipment for all governmental departments, including the Army, the Navy, the Post Office Department, the Department of the Interior, and all Government aviation equipment.

As to the matter of training, operation, and field supply, I do not think that it would benefit the provisions for the defense of the Nation to separate the tactical units of aviation from the Army or from the Navy. I believe that operations, training, field supply, and maintenance should be kept under the Army and under the Navy. I do believe that a separate department of the Government—I do not know whether it should be a commission or whether it should be a Cabinet officer—should be appointed to take charge of what we might call commercial aviation, because I consider that

Government encouragement of commercial aviation is the cheapest way we can maintain facilities ready for the production of aircraft in case of emergency.

I think that as regards engineering work and research work, the wisest plan would be to keep engineering departments—we might call them technical sections—under both the Army and the Navy, because I believe that the fewer steps between the people who have to maintain and operate equipment in the field, and the engineers who are responsible for the designs and modifications of that equipment, the better.

I do believe, however, that there should be some provision, possibly an assistant to the Director of Aircraft Production, if we might call him that for the moment, who should be held responsible for maintaining closer cooperation between the so-called technical sections of the Army Air Service and the Navy Air Service than now exists. One of our great difficulties, as I see it, to-day is that the engineers who are working in the Army Air Service and the engineers who are working in the Navy Air Service do not know enough about what the other is doing. I think it might be wise to establish or possibly maintain the facilities we have at present for research; that is, physical and chemical research pertaining to materials for airplane construction and so forth, that both engineering sections could appeal to through this one head, to conduct research work that is of interest and common to the two services. I can not see that it would be sound to separate the departments which have to do with training, operations, and field supply of aviation from the services. It is referred to as a united air service, but to my mind instead of being a union, it is a division—it would amount to a division.

The Air Service undoubtedly will become relatively a far more powerful factor in the conduct of war than it ever has been, especially with nations that pay enough attention to the development of aviation, but I think it is only sound that the Director of Military Operations control the aviation. The only way I can see to make it sound to unite the air services of the Army and the Navy, would be to unite the Army and the Navy.

Mr. LaGuardia. Colonel, how does the training for the Navy and the Army differ?

Col. Clark. The preliminary steps are practically the same.

Mr. LaGuardia. Why could not that be united.

Col. Clark. That could be united without any great hurt, but I do not see the necessity for it. I think it is essential that later training in the technique connected with operations in which both the ground army and the air army are concerned, that later training must be done under the Army or the Navy, not only for the education of the flyers, but for the education of the people on the ground or on the water as well.

Mr. LaGuardia. You have reference to observation, I suppose.

Col. Clark. Yes; observation.

Mr. LaGuardia. And the direction of artillery fire?

Col. Clark. And infantry contact patrol, particularly; yes, sir. Long distance bombing operations, while they should be controlled entirely, I think, by the supreme military commander in case of war; there is no real reason why training for that should be under

the military, except that I consider it would probably be more economical to conduct all training under the two services.

Mr. LaGuardia. Separately.

Col. Clark. Yes. I do not see why that should not be most economical in view of the fact that if you grant that the later training in the special work should be under each service, I think probably it would be more economical to conduct all training in that way.

Mr. LaGuardia. How would pursuit work in the air differ, whether it was over land or over water.

Col. Clark. Not greatly, except as to the types of machines you fly.

Mr. LaGuardia. There is no difference in the pursuit machine except as to the landing gear, is there?

Col. Clark. That is the main difference, but I venture to say that the handling—I have never flown a water-pursuit plane, but I venture to say that the handling of a water-pursuit ship, especially in landing and getting away, is quite different from a land-pursuit airplane.

Mr. LaGuardia. The fighting in the air is exactly the same.

Col. Clark. It would be, except the water machine would be a little slower on control, and it necessarily to my mind would be a slightly larger machine.

Mr. LaGuardia. The Navy has used land machines for such pursuit work?

Col. Clark. Yes.

Mr. LaGuardia. So far as land machines go, there is no reason why they could not be trained together?

Col. Clark. No; no fundamental reason, except I believe it would be more economical in view of the fact that some of the training must be done under the services separately.

Mr. LaGuardia. Do you think any of the training should be conducted by the respective services, except observation and the direction of artillery fire.

Col. Clark. I believe all training should be done by the two services, because I believe that is the most economical way to do it in view of the fact that the special training must be done under the two services.

Mr. LaGuardia. If experience has taught us that the overhead charge and the duplication of fields and the purchase of materials, and maintenance, overlapped each other, would you still hold to your opinion?

Col. Clark. No; I do not see any fundamental reason for one arrangement or the other. I do not think it makes much difference, in preliminary training, in training for combat work or in training for bombing; I do not think it makes any difference, and if experience has taught us it is more economical to do that training in common, the Army and the Navy together, I would surely say do that together, except for one thing, and that is you might call on the same flyer to fly an observation machine, or an infantry contact patrol machine, that you might want to fly a bombing machine or a combat machine.

Mr. LaGuardia. Let us take the observation work; that work is carried on by the observer, and the pilot just carries him through the air; is that right?

Col. Clark. I think that a great deal of the actual artillery observation work done in two-seater machines, in which the actual wireless messages were sent by the pilot. The second man was an emergency man, and was there really to protect the man from attack from above, the sides, or the rear. I know that system was used a great deal, especially by England, and the pilot actually spotted the shots and sent the messages.

Mr. LaGuardia. Did we use that system?

Col. Clark. I really can not say.

Mr. LaGuardia. How about reconnoissance?

Mr. Clark. I think in reconnoissance the pilot surely should be acquainted with the work of the Army on the ground as well as the observer. Of course, it is probably more essential that the observer be, but I think that in order to get perfect team work, and in order for the pilot to have an intelligent idea of what is going on, the more he knows about operations on the ground, the better.

Mr. LaGuardia. Let us now take the engineering side of it. There is absolutely no difference, is there, in the general development of the motor, whether it is in a land machine or in a naval machine?

Col. Clark. Practically no difference.

Mr. LaGuardia. And the motor part of it is one of the biggest parts in the development of aviation?

Col. Clark. That is true; yes, sir.

Mr. LaGuardia. In your opinion, do you think it would be better for the country if we concentrated the development of motors and the maintenance of motors, and the supply of motors in one united service, or have two small services working independent of each other, under the present system?

Col. Clark. It is a question of what we mean when we say independent. I think we are too independent now; that is, the Army does not know enough about what the Navy is doing, and the Navy does not know enough about what the Army is doing, and I think if we had a common director for two more or less independent engineering forces, he could assign problems to the two, after they had presented the problems to him. He could sift them out and assign proper problems to the two bodies, so there would not be any duplication of effort. Referring to the matter of engines, while in all the fundamentals the engine is just the same, whether it goes in a seaplane or in a land machine, I think we can not assume that the same engine is ideal for certain types of seaplane that is ideal for certain types of land machines.

Mr. LaGuardia. No; we would not use the same engine. If we have learned any one thing in this war it is that we can not use one engine for every type of machine.

Col. Clark. That is absolutely true, but we will take, for example, the geared engine, if the Navy had a satisfactory geared engine, because of better propeller efficiency at lower air speeds, they would have been better satisfied, because they could have gotten off the water more quickly. We did not have the same need for such a machine in the Army, and if the Navy probably had been working

alone and had had the facilities, and if it had not interfered with production, the Navy probably would have developed a geared engine, while we probably would not have developed a geared engine, because we did not see the same need for a geared engine that they did.

Mr. LaGuardia. So no one developed it, actually.

Col. Clark. That is what it amounted to; yes.

Mr. LaGuardia. Therefore, do you think it would be wise to continue along those lines?

Col. Clark. You mean each service developing its own machines?

Mr. LaGuardia. Yes.

Col. Clark. Yes, I do; except I think there should be closer cooperation. I think we should do everything we can to do away with duplication of effort and of money and duplication of effort and expense.

Mr. LaGuardia. Can you suggest any way we can avoid this duplication of effort, energy, time, and money unless we concentrate it under one control and under one authority?

Col. Clark. At the moment I can not see but what it would be sound to have separate technical sections working on the development of airplanes, engines, accessories, and so forth, but directly by one head. They get problems, and they get in a general way specifications for what they need. They take those problems to that head. The Navy does the same thing, working independently more or less, but with intelligent liaison between the two. The head has got to be the caliber of man who knows enough about it not to let those people work on the same problem. Sometimes, however, it does not do any harm to let two people work on the same problem.

Mr. LaGuardia. That would be true if we could get the ideal condition you describe as necessary. Has not experience taught us that we can not do it?

Col. Clark. It is pretty hard to arrive at an ideal solution. It seems to me that one of the fatal weaknesses of a union of engineering forces is that it puts the people who are responsible for solving these problems connected with the needs of the people in the field too far away from the field. They ought to be as close to the field as they can be, and the more distance you eliminate between the people who are to use the stuff and the people who are to develop it the better.

Mr. LaGuardia. That is what we are trying to do. Do you think it would carry out your ideas, with two separate services, if we take a man from the line, an excellent soldier, if you please, and place him at the head of Army Aviation, and take a good Navy man and put him at the head of their Aviation Service? Is that conducive to bringing about this perfect state, with internal harmony and cooperation with each other?

Col. Clark. I do not think I quite understand the question.

Mr. LaGuardia. Under the present system, your answer was that we should bring the head of the service as close to the field as possible and bring the technical division as close to the field as possible?

Col. Clark. Yes.

Mr. LaGuardia. Under the present system, we run the risk of having a man put at the head of Army aviation who might be an

excellent officer and yet have no technical experience or no experience in connection with aviation, and the same thing might happen in the Navy; would that bring about good internal working conditions and cooperation between the two services?

Col. CLARK. No, it would not, if those things had to go through several hands up to the head and back again.

Mr. LAGUARDIA. They do now, under present conditions.

Col. CLARK. Yes, unfortunately; they do.

Mr. LAGUARDIA. Have you sufficient freedom of action at Dayton to act on and get the work done you needed?

Col. CLARK. No; and worse than that, the present system is such that we are not closely enough in touch with the people in the field.

Mr. LAGUARDIA. Are you close enough to the Navy to know what their technical work is and they to know what your work is?

Col. CLARK. No; that is a bad feature of the present system.

Mr. LAGUARDIA. We are trying to get away from the present system; that is our purpose. Would you say the last word has been said in the matter of propellers?

Col. CLARK. No.

Mr. LAGUARDIA. Can we not develop that better if we had a united Air Service, where we would concentrate the best talent on propellers?

Col. CLARK. No; I think that is absolutely wrong. I think the more people you can get off in separate little barns working on propellers, the better it is. I think the business of having all-star aggregations is fundamentally unsound, so far as engineers are concerned.

Mr. LAGUARDIA. That is undoubtedly true, but it is not the intention to put all the stars in one department. We could not get them in the Army, or in the Government service.

In view of the delays and difference, should we not have one central point to go to where we could find the best experience in the matter of experiments, engineering, and so forth, and where we could get advice and counsel?

Col. CLARK. One instead of two.

Mr. LAGUARDIA. Instead of three or four, as we have now.

Col. CLARK. As far as that particular phase of the matter is concerned, the matter of the testing of propellers, it probably would not hurt to put that under a general research department which would serve for both the Army and the Navy.

Mr. LAGUARDIA. Would that also apply to motors?

Col. CLARK. That might apply to motors.

Mr. LAGUARDIA. And to the general design of airplanes——

Col. CLARK. No.

Mr. LAGUARDIA. Colonel, are not land machines landing in water now?

Col. CLARK. Yes.

Mr. LAGUARDIA. By the use of air bags?

Col. CLARK. Yes.

Mr. LAGUARDIA. So that the present system of flying boats and pontoons might be abolished, eventually?

Col. CLARK. Eventually. They can land in water, but they can not get away.

Mr. LAGUARDIA. Get away from ships?

Col. CLARK. Yes. Airplanes can get away from certain ships under certain conditions.

Mr. LAGUARDIA. We have floating airdromes?

Col. CLARK. I have heard about them.

Mr. LAGUARDIA. That is quite possible of development?

Col. CLARK. Yes.

Mr. LAGUARDIA. Especially in a country like England?

Col. CLARK. Yes; I think it is an interesting development.

Mr. LAGUARDIA. Then we agree that there is a great deal yet to be developed in aviation?

Col. CLARK. Yes; we do.

Mr. LAGUARDIA. We agree that the creation of a system which will bring about perfect coordination among the different departemnts and give assistance and encouragement to private development is ideal?

Col. CLARK. There is no doubt about that.

Mr. HULL. I do not know that I care to ask you very many questions. I think your idea is practically the same idea I have in regard to the service.

Your idea, as I understand it, is simply that there should be the creation of a central control that could develop an airplane as it saw fit, but that if the man having this central control thought the Navy was better fitted to go ahead with certain work he would turn it over to the Navy. If he thought that his department was better fitted to do it independently, he could go ahead and do it; is that your idea?

Col. CLARK. No, sir; I would not have the central control have that much latitude. I think the Army technical section still would have to work on the problems that affect them alone, or principally.

Mr. HULL. The man put in charge of this central control, this proposed, department of aeronautics, is unquestionably going to be imbued with the idea of making a success of the thing. Should he not have authority; would you not give him any control at all?

Col. CLARK. Oh, yes; I guess I misunderstood your first question. I thought you meant he could take all the development away from the Navy if he thought he had a better personnel for its development and that he could take all the engineering problems away from the Army and put them under the Navy, if he saw fit.

Mr. HULL. Unquestionably, you can not by legislation define just where the line should be drawn. My idea is that you have got to have a coordinating branch with authority.

Col. CLARK. There is no question about it.

Mr. HULL. If it is going to be a coordinating branch, it has got to have central control.

Col. CLARK. That is true.

Mr. HULL. And if the man at the head of that department of aeronautics has central control, he is not going to try to take it all over even though you give him the authority.

Col. CLARK. I misunderstood your question.

Mr. HULL. He is going to try to build that department up.

Col. CLARK. Yes, and he should have that authority.

Mr. HULL. And being in charge, he has better authority than any of them?

Col. CLARK. That is right.

Mr. HULL. He knows where he wants to apply that authority?

Col. CLARK. Yes, sir.

Mr. HULL. He can work out the problem better than you or I?

Col. CLARK. He is at the top and he is looking over the edge of the hole, and you are digging down.

Mr. HULL. It would work much more satisfactorily to all branches?

Col. CLARK. Yes, sir; if we got the right man.

Mr. HULL. We always have to figure that we will get the right man. If he is not the right man we would get rid of him; that is unquestionably true?

Col. CLARK. Yes.

Mr. HULL. We have got to place the machinery somewhere; that has been my thought. I think it is the thought of a great many of us. Of course, a great many people would go a great deal further than that; some of them would even create an independent staff, but as far as I can see that would not do at all. I am willing to give this man full authority to do almost anything and let him work it out, and I think Congress is willing to do that.

Col. CLARK. I think it is most essential, if he is going to get the results, that he should have more authority than any one else has.

Mr. HULL. That is all we can do, give him the money and give him the authority, and give him the assistants he needs, and I think he will be able to work this problem satisfactorily to the country. That is about as far as we can go. That is your idea?

Col. CLARK. Yes, sir.

Mr. OLNEY. Colonel, as I understand your idea, where there is healthy competition between Army and Navy aviation and the patrol of the forests, that should be encouragtd along those lines, so that if the Army or the Navy or the forest patrol people develop better equipment they should be encouraged along those lines by a head of Army, Navy, Post Office Department and Interior Department aviation working through a central control or authority, which as I take it you favor?

Col. CLARK. Yes, sir.

Mr. OLNEY. Simply requiring cooperation and coordination in all the branches, but with the idea that healthy competition, as in any industry, will be helpful?

Col. CLARK. Yes, sir. There is another point in that connection, and that is the matter of trying to concentrate all engineering talent in one place, as, for instance, under any governmental experimental station. I think that is very unsound. I thing we ought to encourage outside designers to work, each out in his own little barn and encourage competition there, although I agree with Col. Hall absolutely in connection with this matter of competition that right now, unless we are careful, it is going to make a lot of companies liquidate and will be a very bad thing for the industry.

Mr. OLNEY. Because of the fact that they can not arrive at a definite conclusion as to the cost, and they were apt to underbid.

Col. CLARK. They are admost forced to underbid on cost or overbid on components.

Col. HALL. It is not so much underbidding, as long as any manufacturing industry is dependent absolutely on the continued production. A manufacturer can not put in $1,000,000 on a plant to do

one job and then lie idle for six months. He will go broke if he does that. Then if he bids competitively he does not know whether he is going to get the contract or not, and his board of directors will force him to liquidate. I know that situation is existing right now in six or eight manufacturing concerns, which are still ready for aircraft production, where the question has come up whether they will not liquidate now since there is no program ahead.

Col. CLARK. I agree with Col. Hall heartily, and I want to indorse especially two points he made; that is, if some provision could be made under the law guaranteeing continuous production for these people over a number of years, say, 10 years, it will help preserve the industry. Another point is in regard to a thing we never have been able to provide for, and that is a proper means of getting better equipment. I think that must be done.

Mr. HULL. You refer to a guaranty?

Col. CLARK. That would amount to the same thing.

Mr. HULL. That is absolutely impossible, is it not?

Col. CLARK. I do not know of any system under which it could be done.

Mr. HULL. Under our form of Government it is absolutely impossible; it is a dream. There is no man or set of men authorized to give a guaranty.

Col. CLARK. I realize that.

Mr. LAGUARDIA. Would not one solution be by having all aviation activities under one head, so that this head would have control of the Army and Navy and forest patrol and other aviation work, and in that way distribute these orders through the country to keep the industry alive?

Col. CLARK. I think I said that I believed the production program, the inspection and finance and the major overhaul should be under one head.

Mr. LAGUARDIA. So that the best we can do under our system of Government is to do that; we can not guarantee any more than that?

Col. CLARK. I am afraid not.

Col. HALL. I would suggest that you do the same as Congress has done with the Navy. You can appropriate five or ten million, or whatever you think best, every year, and authorize an amount to cover 10 years. Of course, the next Congress could repeal it, but the experience has been that if it is wisely appropriated they will not repeal it. I think that has been the greatest possible advantageous element in building up our Navy.

Mr. LAGUARDIA. Is there not this difference, that that was done in the case of the Navy because the building of a battleship takes longer than the fiscal year, and we would not tie up with contracts in that way because of the rapid development of aviation? Is there not that difficulty?

Col. CLARK. Any one contract, especially at this time.

Col. HALL. Right there, the same policy would apply to the aircraft industry. If Congress should say we desire that $5,000,000, or some other sum, shall be expended this year and next year, and each year after that for 10 years, and we will appropriate for 10 years $50,000,000. It is true the next Congress might repeal that law, but the manufacturer would believe that Congress would not repeal the

appropriation, and therefore the manufacturer would put his money in it, and if we allocate the contracts he could have a reasonable dedegree of certainty in respect to his business as to whether he could expect business.

Mr. MORIN. Congress adopted a naval program for 10 years that met the approval of the country. If we adopt a program of aeronautics which is satisfactory to the country I believe future Congresses would let it stand.

Col. HALL. In making a program for the Air Service, I doubt whether we want to spend five or ten million dollars a year; that is a matter of future policy as to how much money we want to put into it every year. But it must be a matter which is constant. We must have an organization which will economically spend the money that is appropriated, and I take it that that is what this committee is working on. But there are certain fundamental principles which govern that if you are going to get the best kind of an organization. But if you get the best kind of an organization and they do not have the money and the facilities they can not get the results.

Mr. OLNEY. One of the witnesses testified yesterday, upon being asked what number of men would be required for the Aviation Service of all kinds, that 50,000 men would be necessary. Have you come to any conclusion about that?

Col. CLARK. No, sir. It depends on so many things that I could not venture any estimate.

Mr. HULL. I understood that answer to mean that he meant there should be 50,000 men for the Army, the Navy, and everything else.

Mr. LAGUARDIA. That that would be an ideal force to provide.

Mr. HULL. You speak of these factories that are in existence at the present time. Are they in such shape as to be able to go ahead at the present time to manufacture airplanes if we wanted them to?

Col. CLARK. I think there are two factories which could produce a fair amount of airplanes. There are two that could produce a very small amount, and the rest amount to almost nothing but laboratories; they are not equipped either as to organization or as to machine tools to build more than a few experimental planes.

Mr. HULL. What is the best scout plane we have at the present time?

Col. CLARK. You mean the best pursuit plane?

Mr. HULL. Yes, or combat plane.

Col. CLARK. I think the best we have in this country is the Ordnance Engineering plane, all things considered.

Mr. HULL. The one at Dayton?

Col. CLARK. Yes; we have three or four at Dayton now.

Mr. HULL. What kind of engine would that use?

Col. CLARK. The 320-horsepower Hispano-Suiza engine.

Mr. HULL. Have we any of those engines in the country at the present time?

Col. CLARK. Yes; we have quite a number.

Col. HALL. About 400.

Mr. OLNEY. How many have you at Dayton?

Col. CLARK. Of the engines?

Mr. OLNEY. Of the machines.

Col. CLARK. We have about four. It was purely an experimental order; no order has been placed beyond that number, as far as I know.

Mr. HULL. Having an engine, in an emergency, how long would it take to produce those?

Mr. LAGUARDIA. In quantity production?

Mr. HULL. Not necessarily in quantity production, but in any reasonable number?

Col. CLARK. You mean how long would it take that particular company to expand its factory?

Mr. HULL. You have your designs at the present time. How long would it take, say, to produce 100 of those?

Col. HALL. This Ordnance Engineering machine has no factory.

Mr. HULL. I mean if you take it and give it to some factory to produce.

Col. CLARK. Give it to another factory?

Mr. HULL. Yes.

Col. CLARK. To get 100?

Mr. HULL. Yes.

Col. CLARK. Under present conditions I would say it would take about a year.

Mr. HULL. To produce anything?

Col. CLARK. To get 100 in the field. That brings up a point on this matter of rewarding the designers. If you take that design that this man spent a long time on, if you took that design out of his place and put it in another factory he has lost money on the proposition.

Mr. HULL. I mean taking the design as it is and placing it in a factory and say that you want 100 of those machines as quickly as they can be produced. We have the engine. Why would it take a year to produce those?

Col. CLARK. It does not look offhand as though it should take that long, but I state that from my experience.

Col. HALL. I have negotiated on these things, and I think Col. Clark is right.

Col. CLARK. It takes time to get production drawings made of the machine. To-day there are just enough drawings so they can make an experimental machine in the shop. The drawings necessary to build an experimental machine, where the designer is standing right over the machine tools and over the assembly of the machine, are comparatively and largely inaccurate. If you took that machine and put it in a factory where the people do not know anything about the design you have to have very complete drawings of every part of the machine. That takes not a little time; and after that you have to tool up for that thing if you are going to produce it in any quantity. The matter of making gigs and special tools requires some time. The matter of building up an organization, with the necessary technical force, takes time.

Mr. HULL. How does that machine compare with the best machine England, France, and Italy have produced?

Col. CLARK. We have received very conflicting reports about the performances over there. I have the report that there is a machine in France with the same engine that makes 175 miles an hour. You are speaking of the speed and the climbing qualities?

Mr. HULL. That is the largest element that enters into a real combat plant, that is, speed and ability to maneuver?

Col. CLARK. Bigger than any of those, to my mind, is simplicity for maintenance in the field, and that is a thing which are designers over here had not brought home to them. That is one thing about the German Fokker. If you put 100 of those machines at the front you ought to keep 90 of them in commission. You take a typical machine of that same type we have designed here, and it may outperform the Fokker, but out of 100 of those machines at the front you may not be able to keep more than 20 of those in commission. Simplicity of maintenance in the field, strength of structure, maneuver ability, speed, and climbing ability are the big things. I think that the Ordnance Engineering machine, all things considered, compares very favorably with anything in the world, although I have not seen the machines on the other side for quite awhile. I am just going on the reports I have.

Mr. HULL. How does it compare with the German Fokkers you have here?

Col. CLARK. It outperforms them on manever ability. It is not quite as big as the Fokker; on field maintenance it is not up to the Fokker.

Mr. LAGUARDIA. We are very much obliged to you, Colonel.

It was stated here the other day that all the general officers disapproved separation of the service. I thought instead of getting the general officers here to testify I might read into the record some telegrams which some of them sent in response to a request of The Adjutant General on the suggestions made by the board composed of Gen. Kuhn, Gen. Snow, and Gen. Coe.

Mr. HULL. That board favors it?

Mr. LAGUARDIA. Yes; it was stated that the generals did not favor it. Here is a telegram from Maj. Gen. Hay:

BATTLE CREEK, MICH.

DIRECTOR OF AIR SERVICE,
War Department, Washington, D. C.:

Reference telegram Adjutant General of the Army August 23, directing me wire Director Air Service my opinion of advisability of establishing department aeronautics as a Cabinet position. From my experience in the past war it is my opinion that the Aviation Service, if properly fostered and developed, will play a part in any war of the future equal in importance to that played by the Army and Navy, and other things being equal, that nation will be successful which has control of the air. So long as the building up of the Air Service, the training of large numbers of pilots, and the securing of appropriations necessary depend upon the scattered efforts of the Army, Navy, and Post Office Department, each one having to go before Congress to obtain the necessary appropriations, we will never obtain the result as it should be.

The only way, in my opinion, in which the Air Service in this country can be developed to the maximum of its efficiency at the minimum of cost will be to gather in the hands of one department all the agencies which will go to foster interests in the service, conduct experiments as to types, obtain the necessary appropriations, train large numbers of aviators, and equip the service with the necessary supplies. In other words, we must concentrate all the agencies which favor development of aeronautics and direct their efforts toward a common end. In my opinion this can never be done under the present system of scattered efforts and divided responsibility. For these reasons I am strongly in favor of the bill recently introduced in Congress to establish a department of aeronautics as a Cabinet position, which shall have charge of all matters pertaining to the purchase, manufacture, maintenance, and production of all air-

craft in the United States, as well as the direction and control of all personnel necessary in connection with the Air Service.

HAY,
Major General, United States Army.

Here is a telegram from Maj. Gen. Traub:

FORT THOMAS, KY.

DIRECTOR OF AIR SERVICE,
Washington, D. C.:

Referring to telegram from Adjutant General August 23. From my experience in the past war I am absolutely convinced of the advisability of the establishment of a department of aeronautics as a Cabinet position, with the powers and under the conditions specified in said telegram. My experience with aviators has been that they are a body of men with wonderful possibilities, but they need above all strict disciplinary training, as they are apt to consider themselves superior to the necessity of strict compliance with competent orders, especially in an emergency. If this point be given prime consideration the possibilities of the new department should prove of inestimable value to the country in time of war especially.

TRAUB, *Commanding.*

Here is a telegram from Gen. Edwards:

BOSTON, MASS.

THE ADJUTANT GENERAL,
Washington:

I have your telegram directing that I give my opinion from my experience in the past war as to the advisability of the new department to direct Air Service. I am inclined to believe that if the units of aviation as the telegram states would be assigned to the Army and Navy for training in times of peace, and in war such personnel would be under the complete control of the Army and Navy, to approve the project.

EDWARDS.

Then there is a letter signed by Gen. Mitchell, which reads as follows:

WAR DEPARTMENT,
OFFICE OF THE DIRECTOR OF AIR SERVICE,
Washington, August 27, 1919.

From: Brig. Gen. Wm. Mitchell, United States Army.
To: The Adjutant General of the Army.
Subject: Cabinet position as department of aeronautics.

1. In answer to your letter of August 23 on the subject of a department of aeronautics, I believe that this is the only solution which will develop an efficient Air Service in this country as an element of national defense. Experience has shown not only in this country but in others that an Army and Navy block the efficient development of aviation. By providing a department of aeronautics as proposed, much more efficient service will be given to the Army and Navy because the personnel of an air force will not be limited to their development of such units.

2. I inclose herewith data presented by me on this subject to the board of officers convened to investigate this question.

WM. MITCHELL,
Brigadier General, United States Army,
Chief Training and Operations Group.

STATEMENT OF COMMANDER W. G. CHILD, AVIATION SECTION, OFFICE OF NAVAL OPERATIONS, NAVY DEPARTMENT.

Mr. LAGUARDIA. Commander, what are your present duties?

Commander CHILD. I am in the Office of Naval Operations, Aviation Section, and my duties are as a working member of the Joint Army and Navy board on aeronautics.

Mr. LAGUARDIA. How long have you been in the Navy?

Commander CHILD. Since June, 1903.

Mr. LAGUARDIA. You are an officer of the regular Navy?

Commander CHILD. I am a regular naval officer.

Mr. LAGUARDIA. How long have you been in aviation?

Commander CHILD. Since April, 1915.

Mr. LAGUARDIA. You are yourself a flier?

Commander CHILD. Yes, sir.

Mr. LAGUARDIA. Commander, at the present time how is naval aviation controlled?

Commander CHILD. We have at the head of it a director of naval aviation, or rather at the head of naval aviation is the Chief of Operations. He has under him a section known as the planning section, at the head of which is the director of naval aviation, which is supposed to plan for aviation. Construction, materials, procurement, and operations are handled by the various bureaus of the Navy Department.

Mr. LAGUARDIA. So that it is necessary to go from one bureau to another to get a complete plan of any airplane?

Commander CHILD. Yes, sir.

Mr. LAGUARDIA. Is that ideal?

Commander CHILD. No, sir.

Mr. LAGUARDIA. Who is conducting the training of naval aviators now?

Commander CHILD. That is done by the Bureau of Navigation.

Mr. LAGUARDIA. Have you your own training field?

Commander CHILD. We have one at Pensacola.

Mr. LAGUARDIA. Is that the only one?

Commander CHILD. Some training is also done at San Diego, I think.

Mr. LAGUARDIA. By the Army?

Commander CHILD. By the Navy; we have a field at North Island.

Mr. LAGUARDIA. Is the Army doing any training of naval fliers?

Commander CHILD. The Army is training the ships' pilots for the Atlantic and Pacific Fleets at the present time.

Mr. LAGUARDIA. Are they trained satisfactorily by the Army?

Commander CHILD. I have not seen the reports, but I understand it is satisfactory. However, it does not completely train the pilots for shipboard work.

Mr. LAGUARDIA. Who controls the marine aviation service?

Commander CHILD. That is controlled by the Navy Department, but the Commandant of the Marine Corps has charge of it.

Mr. LAGUARDIA. What do they do in the matter of supplies and equipment?

Commander CHILD. Those things are allotted to them by the Navy.

Mr. LAGUARDIA. They have a subdivision for that, too? Has the Marine Corps its own repair section and procurement and technical division for its air service?

Commander CHILD. No; they have no technical division. Marine Corps aviation is used in connection with their advance base units. They have advance bases where they keep operating personnel for their advance base work.

Mr. LAGUARDIA. Do they do their own training?

Commander CHILD. No; their training in the past has been done by the Army or the Navy.

Mr. LAGUARDIA. How do they get their equipment?

Commander CHILD. They get it from the Navy; that is, there is no separate appropriation for Marine Corps aviation; it is all handled through the Navy and they are allotted certain amounts for certain purposes.

Mr. LAGUARDIA. But there is a separate command?

Commander CHILD. Yes.

Mr. LAGUARDIA. Do they use land or water machines?

Commander CHILD. They use both.

Mr. LAGUARDIA. Do you use both land and water machines in the Navy?

Commander CHILD. Yes.

Mr. LAGUARDIA. You served overseas during the war?

Commander CHILD. Yes, sir.

Mr. LAGUARDIA. Bombing pilots were trained in Army schools, were they not?

Commander CHILD. Yes, sir; to some extent. They were mostly trained by the French and British.

Mr. LAGUARDIA. And your chief operation was what was known as the northern bombing project, was it not?

Commander CHILD. Not the chief operation. It was one of our projects.

Mr. LAGUARDIA. And they used land machines with that?

Commander CHILD. Yes.

Mr. LAGUARDIA. Were you connected with that?

Commander CHILD. No, sir.

Mr. LAGUARDIA. Where were you stationed?

Commander CHILD. I was stationed at headquarters in Paris, in charge of the technical division of aviation.

Mr. LAGUARDIA. Are you in a position to know that at one time the naval aviation forces had personnel available and the Army tried to get them but could not get them?

Commander CHILD. No, sir; I do not know that.

Mr. LAGUARDIA. You did not get equipment until late in 1918?

Commander CHILD. We were just getting well started when the war ended.

Mr. LAGUARDIA. How many aviators did you have there?

Commander CHILD.. We had, I think, about 5,000 commissioned personnel, and about 25,000 enlisted men.

Mr. LAGUARDIA. You about got started in October, 1918?

Commander CHILD. Yes.

Mr. LAGUARDIA. And the war ended on November 11, 1918?

Commander CHILD. Yes.

Mr. LAGUARDIA. Commander, what are your views in connection with the matter of uniting all aviation activities of this Government, so far as production, the technical work, supplies, maintenance, and so forth, are concerned?

Commander CHILD. I think they should be united in that respect.

Mr. LAGUARDIA. How far would you go in the unification of the services?

Commander CHILD. I have not studied this question thoroughly and my opinions are only based on experience. I think that aviation would progress much more rapidly under a service which combined all activities. I also think it would be much more economical and there would be greater cooperation and coordination. It would have a head whose sole duty and responsibility would be to build up an efficient national aviation organization, instead of the present hydra-headed department organizations. But there might be difficulties, I think, in the coordination of a separate service with the Navy itself. I mean that the commander in chief of the fleet might have more difficulty with the separate corps than he would with his own forces, even if they were put under his complete charge, although I do not see any great difficulty in securing proper cooperation.

Mr. LAGUARDIA. It is true, is it not, that if there is a joint operation of the Army and the Navy the senior officer would be in command of the combined forces?

Commander CHILD. It depends upon where the operation is. If it is a land operation, the senior Army officer would have charge; and if it was a naval operation, the senior naval officer would be in command.

Mr. LAGUARDIA. The marines and the naval detachments in charge of the large pieces of naval artillery which operated in France were directly under the command of the army in France?

Commander CHILD. Yes.

Mr. LAGUARDIA. And it worked out all right there?

Commander CHILD. Yes; I think it did.

Mr. LAGUARDIA. What is your opinion as to the tactical use of the air in future wars?

Commander CHILD. I think it is going to be the greatest single factor in the successful carrying on of a war. I think the future of aviation is not fully appreciated by the Navy, at least. I do not know about the Army.

Mr. LAGUARDIA. Would not one way to overcome that be to separate it and let it grow and take its natural course of development?

Commander CHILD. I believe it would go ahead much faster.

Mr. HULL. Then you favor a separate Air Service or a united Air Service, so far as research and production goes?

Commander CHILD. I do; yes, sir. That is, I think that no matter whether there is a combined service or not, the Army and the Navy must keep their research departments to some extent separate.

Mr. HULL. Of course, that would be up to the central department, or central authority. Unquestionably the man having that authority would permit it, if he were the right kind of man. You do not believe in a united Air Service, so far as personnel goes, if I understand you correctly?

Commander CHILD. I think I do, sir. I see difficulties; that is, some difficulty, perhaps, in a thorough cooperation between a separate force and the Navy. If you recruited personnel from the Navy for your separate force, I do not see why we could not obtain excellent cooperation, just as good as we would get with an air force under the Navy.

Mr. HULL. Then you would put the air force of the Navy under this independent control?

Commander CHILD. Yes; if you had a combined force it would be, but while it is operating under the Navy it would have to be under the complete command of the commander in chief.

Mr. HULL. Of the Navy?

Commander CHILD. Yes, sir.

Mr. HULL. And then they would be detailed back with the Navy?

Commander CHILD. Yes. My reason for favoring a separate corps is because I think aviation would get ahead much faster because you would have one man whose sole duty and interest would be in aviation, whereas with the present system, in the Navy, we have at the head of aviation an officer with aviation only as a small part of his duties and he can not give it the attention it ought to have, no matter how favorably he may feel toward aviation. If that officer is not favorably disposed toward aviation, then aviation suffers and may be greatly retarded during his tenure of office, namely, four years.

Mr. HULL. Do you or not believe that the best thing for us to do would be simply to create an executive department which would have the control of the Air Service in all these branches, with full power to detail back or coordinate, or to say just what the Navy and Army is to do?

Commander CHILD. Yes; I think that is essential.

Mr. HULL. That is about all we can do, is it not?

Commander CHILD. I think so; yes, sir.

Mr. HULL. If we try to go into the details, we will get lost.

Commander CHILD. Yes, sir.

Mr. HULL. We would have to depend upon this department to work out the details itself; is that not true?

Commander CHILD. Yes, sir.

Mr. HULL. Unquestionably, if they worked harmoniously, as they probably would, they would have in that department a man from the Army, a man from the Navy, and a man from the commercial end of it; they would work out all these minor problems much better than a committee of Congress or of Army and Navy men?

Commander CHILD. Yes, sir.

Mr. FISHER. The statement has been made by some witnesses that naval aviators practically unanimously oppose a separate Air Service, whereas Army aviators practically endorse and urge the creation of a separate Air Service. Can you give us an explanation of that situation, if that is correct?

Commander CHILD. No, sir; I can not. I have not talked to a majority of the aviators. I have thought over the advantages and disadvantages of a separate Air Service, and think the advantages predominate. I think that perhaps the majority of naval aviators are opposed to a separate Air Service.

Mr. FISHER. Have you talked with a number of them?

Commander CHILD. I have talked with only a few and I have not read over——

Mr. FISHER (interposing). We have not had the advantage of their testimony before this committee, and so we only have what the Army officers think about it.

Commander CHILD. Capt. Craven has obtained the views of all naval aviators on that subject.

Mr. FISHER. You are not familiar, yourself, with their attitude?

Commander CHILD. No, sir.

Mr. LAGUARDIA. You would not say they are all opposed to it, would you?

Commander CHILD. No, sir.

Mr. LAGUARDIA. Capt. Mustin is in favor of it?

Commander CHILD. Yes.

Mr. LAGUARDIA. He favors a separate service, does he not?

Commander CHILD. According to his report, he does, with reservations.

Mr. FISHER. Do you know whether or not the naval aviators take into consideration the development, on a very large scale, of aviation for all departments when they make up their minds against a separate Air Service?

Commander CHILD. I can not say, sir.

Mr. HULL. You are getting some airplanes now for the Navy?

Commander CHILD. Yes, sir.

Mr. HULL. You have no great difficulty in getting them?

Commander CHILD. I can not say how long it takes.

Mr. HULL. How much money did Congress give you last July?

Commander CHILD. The appropriation was $25,000,000.

Mr. HULL. Was that sufficient?

Commander CHILD. It was not sufficient for the program we wanted to carry out.

Mr. HULL. But you have succeeded in getting some machines with that $25,000,000?

Commander CHILD. Yes, sir.

Mr. HULL. Do you know how many?

Commander CHILD. No, sir; but I think the total sum has been allotted. It is comparatively a small number of machines.

Mr. HULL. How much money did the Navy have during the war?

Commander CHILD. I do not know.

Mr. HULL. The Navy got machines then?

Commander CHILD. Yes, sir; we got a great many by transfer from the Army—that is, of land machines—and, of course, a large number of seaplanes and flying boats.

Mr. HULL. Our Navy program is probably equal to that of foreign governments at the present time?

Commander CHILD. England and France, I think, have both appropriated sums for all aviation purposes combined, army, navy, and civil. England, I think, asked for £60,000,000.

Mr. LAGUARDIA. That is for a united service?

Commander CHILD. For all aviation purposes.

Mr. HULL. Did they get that?

Commander CHILD. I think it was allotted at first and then later reduced.

Mr. HULL. Our Navy is not behind the foreign navies, as a practical matter, in the naval development of the airplane, is it?

Commander CHILD. I think perhaps it is behind England. We are certainly behind in dirigibles, in ship's planes, and in aircraft carriers.

Mr. LAGUARDIA. Which are the chief functions of naval aviation?

Commander CHILD. Yes, sir. I think that our flying boats are equal to those of England, or perhaps superior.

Mr. HULL. What do you think of the dirigible, so far as defense in war is concerned?

Commander CHILD. I think the rigid dirigible is absolutely essential for a properly balanced fleet. We need a fleet of dirigibles as much as we need cruisers.

Mr. LAGUARDIA. Have we any dirigibles of our own?

Commander CHILD. We are purchasing one in England, the *R-38*.

Mr. LAGUARDIA. Which is a sister ship of the *R-34*?

Commander CHILD. No, sir; that is larger. We are getting ready to construct one.

Mr. LAGUARDIA. From that model? We have not developed any of our own of that type yet?

Commander CHILD. What we are going to construct is a development in the Bureau of Construction and Repair from the *L-33*, a German ship, brought down in England, and of course it will be behind those ships when it comes out. But nevertheless it is essential to start on a smaller type of ship, anyway. It will be very useful.

Mr. LAGUARDIA. Do you know whether we have actually purchased the *R-38*?

Commander CHILD. I do not think the negotiations have been completed. I would like to say a few words about a continuing appropriation. I think a planning division in the Army and Navy or the joint Army and Navy board could get together and determine what stations and what aviation development are necessary for a certain number of years.

We know that we must have a rigid fleet; we know we will require certain rigid stations on both coasts and in our island possessions. This planning division would decide which are the most important and which should come first. I think Congress might adopt a certain program of aviation development which would require a continuing appropriation, the same as is done for the development of a fleet.

Mr. LAGUARDIA. Could that purpose be better served under a separate service or under a united service?

Commander CHILD. Under a united service a great deal of controversy regarding the uses of the dirigible would be avoided, and unless we can coordinate the activities of the Army and Navy in regard to the development of rigid dirigibles there will be duplication in stations.

Mr. LAGUARDIA. But to judge from your past experience, you believe it would be better to start anew with this united service?

Commander CHILD. I believe that a great deal of duplication and controversy would be avoided in a combined service with one head to make decisions. It is very difficult to coordinate activities already established.

Mr. LAGUARDIA. We are very much obliged to you, Commander.

At this point I desire, if there is no objection, to insert in the record a memorandum from Capt. Mustin, of the Navy, who is stationed on the Pacific coast, and also the letter from the Secretary of the Navy forwarding the memorandum. I may say that Capt.

Mustin was a member of the Aviation Commission, of which Assistant Secretary of War Crowell was the chairman.

(The matter referred to is as follows:)

THE SECRETARY OF THE NAVY,
Washington, December 8, 1919.

MY DEAR SIR: I am in receipt of your favor and am sending you statement from Capt. Mustin, and Capt. Craven will hold himself ready to come before your committee at any time that you will notify my office.

Sincerely, yours,

JOSEPHUS DANIELS.

Hon. F. H. LAGUARDIA,
House of Representatives, Washington, D. C.

MEMORANDUM FOR DIRECTOR OF NAVAL AVIATION.

Referring to your letter requesting my opinion on the form of aviation organization that is desirable for the United States, I have to reply as follows:

In my opinion aviation should be organized on the following lines:

1. Each branch of the Government that uses aviation should have an aviation division (or detachment) composed of its own commissioned, enlisted, or civil-enlisted personnel.

2. Each branch of the Government that uses aviation should have full control of its own aviation operations and the special training of its personnel that is required for developing aviation as an auxiliary to its major operations.

3. Each branch of the Government that uses aviation should have an organization and facilities for the special experimental development of aviation material that is perculiar to its own methods of utilizing this auxiliary to its major operations.

In my opinion line duty in the Navy and Army air detachments should be on the detail system. As far as the Navy is concerned, air operations is a specialty of the same class as gunnery, destroyer duty, or submarine duty; full efficiency of the fleet can not be attained unless a liberal proportion of the flag and commanding officers have the intimate knowledge of these auxiliaries that can be gained only by having specialized in these.

4. In order that commercial aviation may be encouraged and developed sufficiently to build up and maintain an aircraft industry adequate for war time supply, there should be a separate air department (whose civil head is preferably a Cabinet member) charged with the following aviation activities:

(1) Supervision of commercial aviation officers.

(2) Research and experimental work of the class that is common to the fundamentals in the design of all aircraft—civil as well as governmental.

(3) General training, practical and theoretical, of the kind that is a common requirement for the personnel in each branch of the Government that uses aviation.

(4) General supply: An agency for the supply of aircraft material to all branches of the Government that uses aviation.

(5) Maintenance of an air force whose duties are the air specialties—raiding and fighting. This force although organized independently of the Army and Navy should be available for assignment to duty with either one or the other.

All leading positions in the air department except the civil head to be filled by officers who are commissioned in the air force; thus for two reasons:

(*a*) In order that the operating methods of the air department throughout shall be along lines that will insure the rigid discipline necessary for safety in all matters connected with aviation.

(*b*) In order that this may be a means for employment of officers of the air force who, by reason of age or other causes, have passed beyond the period of their ability to participate in active work of the air.

See my letter August 28, 1919, on aviation organization in Great Britain, France, and Italy for reasons for above suggestions and diagram of type of organization.

H. C. MUSTIN,
Captain, United States Navy.

STATEMENT OF LIEUT. COL. A. R. CHRISTIE, AIR SERVICE.

Mr. LaGuardia. What is your name and rank?

Col. Christie. A. R. Christie; lieutenant colonel.

Mr. LaGuardia. In the Air Service?

Col. Christie. Yes.

Mr. LaGuardia. How long have you been in the Air Service?

Col. Christie. Since 1914.

Mr. LaGuardia. How long have you been in the Army?

Col. Christie. Since 1912.

Mr. LaGuardia. Colonel, will you give us the benefit of your experience as to how a perfect liaison between the Army and Navy could be worked out under a separate Air Service?

Col. Christie. I may say, Mr. Chairman, that I am a working member of the Joint Army and Navy Board on Aeronautics, and under the present system there are three officers from the Army and three officers from the Navy forming a joint Army and Navy Board who take up all matters in relation to aeronautical activities wherein there might be duplication. I was just recently put on this board, previously having served about a month, in June, on the same board, and the same questions are now up before the board as were then before the board. None of them has been settled definitely, such as the joint occupation of North Island, the joint occupation of Fords Island in Hawaii, matters relating to where the jurisdiction of the Army shall end and where that of the Navy shall begin, and things of that sort, and I do not think any questions have been definitely settled yet except some minor ones.

Under the present system they must agree, because there are three members from the Army and three members from the Navy, and if they come to a question wherein they can not agree, each set of officers will advise the Secretary of War and the Secretary of the Navy differently, and you have a deadlock. Of course, there are a lot of questions that can be settled, upon which they can come to an agreement, where there is no conflict of views.

Mr. LaGuardia. That is, on minor details?

Col. Christie. On minor details. But where one has to give up anything to the other, they are deadlocked, as a rule.

Mr. LaGuardia. How would you overcome that?

Col. Christie. By a united Air Service.

Mr. LaGuardia. How would the special work of the Navy be looked after?

Col. Christie. It would be looked after under the separate Air Service because the man at the head of aviation would certainly be interested in it. He would want to make good, and I do not think he is going to be partial to one service or the other, because he is going to be judged by the results in the Air Service as a whole.

Mr. LaGuardia. How long has the joint board, of which you are a member, been in existence?

Col. Christie. There was a sort of form of joint board for a long while. It started with a Zeppelin Board about 1916, but they did not start with any regular meetings until June of this year.

Mr. LaGuardia. You have been on that board ever since?

Col. Christie. No, sir; I was on it temporarily during the absence of another officer, in June, when I was acting as liaison officer with

the Naval Air Service, and recently I was put on it again as a working member.

Mr. LaGuardia. Are there many problems which come before the board in which there are joint interests?

Col. Christie. Yes; quite a few, such as in the matter of duplication of training, the question of the Army training a certain number of naval aviators; joint occupancy of various stations, etc.

Mr. LaGuardia. That has been adjusted?

Col. Christie. Yes; because the Army agreed to take these men and train them on Army machines.

Mr. LaGuardia. Does this board take up the separate work of the two technical departments to avoid duplication there?

Col. Christie. Not as regards technical work, as yet. To a certain extent that may be true. There is a separate technical board.

Mr. LaGuardia. Recently, when both departments submitted their estimates, were these two estimates taken up by the board and compared so as to avoid duplication of appropriations for the same purpose?

Col. Christie. I think it came up then.

Mr. LaGuardia. And was agreed upon?

Col. Christie. Yes, sir. I think in the question of dirigibles there was a conflict.

Mr. LaGuardia. That still exists?

Col. Christie. I think so.

Mr. LaGuardia. How about the development of helium gas?

Col. Christie. They have united on that. They have a station at Fort Worth operated jointly by the Army and Navy.

Mr. LaGuardia. Using both appropriations?

Col. Christie. Yes, sir.

Mr. LaGuardia. It would be much simpler if there was one appropriation?

Col. Christie. Much simpler; yes, sir.

Mr. LaGuardia. How about the training of pilots necessary for both services? Has that been taken up so as to have just one set of training?

Col. Christie. Yes; they train as much as it is possible to train the naval fliers on land planes at the Army school. That is all that has been worked out so far.

Mr. LaGuardia. How many schools is the Navy conducting now?

Col. Christie. There is one at Pensacola and I think the Marines have a school at Miami—or that is closed now, I believe.

Mr. Hull. You think it would be advisable to have a separate air service for all the different branches of the Government?

Col. Christie. Yes, sir.

Mr. Olney. Not with a Cabinet officer at the head, necessarily, through the creation of a new department of the Government with a Cabinet minister at the head of it?

Col. Christie. I think it would be better; that is my personal opinion.

Mr. Morin. You are in favor of creating a department of aeronautics?

Col. Christie. Yes, sir; I am very strongly in favor of it.

Mr. LaGuardia. Colonel, in the course of your duties as liaison officer have you had occasion to speak with many of the naval fliers?

Col. Christie. Yes, sir; a great many.

Mr. LaGuardia. Individually and privately, is it true they are unanimously opposed to a separate Air Service?

Col. Christie. That is not true.

Mr. LaGuardia. That is more the policy of the department?

Col. Christie. Yes, sir.

Mr. LaGuardia. And these gentlemen have to follow that policy?

Col. Christie. I have talked with a good many of them recently, and they are all in favor of anything that will change things as they are at present. They say they do not know about a separate Air Service, but anything that will change things as they are at present.

Mr. LaGuardia. And bring about more coordination?

Col. Christie. Of course, they are regarding aviation purely from the standpoint of the Navy. They are regarding it as a purely auxiliary arm, and are not taking into consideration the fact that it is an offensive arm. Most of them would, I think, like to stay in the Navy and be a part of the Navy organization because they have been brought up in it. But they say they would welcome anything that would be a change from the present situation.

Mr. LaGuardia. And give more chance of development?

Col. Christie. Yes, sir. I think their objection to it previously was due to the fact that they heard of, or read, a great many reports from England as to the Royal Naval Air Service being a part of the royal air forces, and that the Royal Naval Air Service officers considered they did not get a square deal in the matter of promotion under the royal air forces, and they talked with a great many Royal Air Service men who had previously been in the Navy, and they told a great many of our naval officers to oppose to the limit any attempt to unite the air services here because they would be lost in the shuffle.

Mr. LaGuardia. That would apply also to the Army flier?

Col. Christie. From the British experience they felt that the Royal Flying Corps was so large in proportion to the Royal Naval Air Service that it swallowed up the Royal Naval Air Service. I understand since then that the Royal Naval Air Service men in the Royal Flying Corps are better satisfied and that they have come around and considered that it was the best thing that could be done.

Mr. LaGuardia. The united air force of England is working successfully, as far as you know?

Col. Christie. Yes; I have heard no reports to the contrary.

Mr. LaGuardia. Were you overseas?

Col. Christie. Yes, sir.

Mr. LaGuardia. What activities were carried on by naval aviation overseas were entirely by land machines, were they not?

Col. Christie. Yes. They had a certain number of stations on the coast of France doing patrol work against submarines and they had some stations in England.

Mr. LaGuardia. Those stations were cooperating with the French?

Col. Christie. Yes; along the French coast they were.

Mr. LaGuardia. What machines did they use?

Col. Christie. They were using different types of seaplanes and three or four dirigibles.

Mr. LaGuardia. Our own or the French?

Col. CHRISTIE. I think mostly French until the latter part of 1918, and then they had the northern bombing project which I think was started in October, and they made six or eight bombing raids. In addition they had 25 naval pilots and observers with the British and 25 marine fliers and observers with the British.

Mr. LAGUARDIA. On land?

Mr. CHRISTIE. Yes; in the bombing areas.

Mr. LAGUARDIA. Those boys were primarily under the British command?

Col. CHRISTIE. Yes, sir.

Mr. LAGUARDIA. We are very much obliged to you, Colonel.

(Thereupon, the subcommittee took a recess until 2.30 o'clock p. m.)

AFTER RECESS.

The subcommittee met pursuant to recess at 3 o'clock p. m.

STATEMENT OF MR. JOHN M. SATTERFIELD, 355 LINWOOD AVENUE, BUFFALO, N. Y.

Mr. LAGUARDIA. Mr. Satterfield, what is your address?

Mr. SATTERFIELD. 355 Linwood Avenue, Buffalo, N. Y.

Mr. LAGUARDIA. And what is your business?

Mr. SATTERFIELD. Banking.

Mr. LAGUARDIA. You served in the Army during the emergency?

Mr. SATTERFIELD. Yes, sir.

Mr. LAGUARDIA. In the Air Service?

Mr. SATTERFIELD. Yes, sir.

Mr. LAGUARDIA. And served most of your time overseas?

Mr. SATTERFIELD. Yes, sir.

Mr. LAGUARDIA. You were attached to headquarters?

Mr. SATTERFIELD. Yes, sir.

Mr. LAGUARDIA. What were your duties, Mr. Satterfield?

Mr. SATTERFIELD. I was first in the Material Division. Afterwards I was chief of the Airplane and Motor Division; after that I was assistant chief of supply, and after that I served on the Liquidation Board.

Mr. LAGUARDIA. Mr. Satterfield, this committee would like to get your views, based upon your experience overseas, as to just what you believe should be done by way of legislation in order to coordinate aviation in this country for the purpose of forming the nucleus of a proper air force in case of an emergency, and at the same time develop an aviation industry in this country. We will hear your statement without interruption until you are through.

Mr. SATTERFIELD. If you will allow me I will go back a little further than the emergency. In 1915 I came down here to see the Signal Corps, because I was very much interested in aviation, and had been ever since there had been aviation in this country, and had been president of the Aero Club of Buffalo, and connected with the Aero Club of America, and so on, and believed that aviation was bound to become a vital factor in warfare. So I came down here to see what could be done to cooperate with the efforts that were then being made with a view to doing something in my own locality.

I found then that there were a few men here who were deeply interested in aviation and who were trying to do something, but they were hampered by the conditions that then existed and by the relationship with the Army and the red tape with which they were tied up, so that little or nothing could be done. I went back home and took it up with the National Guard of New York and found them willing to encourage us, and secured their permission to organize an aviation unit in the New York State National Guard. I organized a unit in Buffalo at the same time that Col. Bolling organized one in New York City, and we had these two squadrons. At the time of the Mexican crisis both squadrons were moved to Mineola, and we did what we could there. After the Mexican crisis we were disbanded, and then I went into the matter when our other crisis came on and went overseas. So that my experience dates back several years. Throughout, I have been impressed with the fact that it was impossible to create and develop a satisfactory air service under the conditions that existed in the Army.

When we first went abroad, which was in November, arriving in France November 12, 1917, we began our work under the Army regulations and under Army rules. We did the best we could to make the thing work. We could not get along. We could not accomplish the work that had to be done. After a while we realized that thoroughly, and we began to organize what was very much of an independent air service over there in France. We got our new organization going, and then results began to follow. The longer we stayed on the job over there the more independently we worked and the better the results. We found very little cooperation and very little assistance from the general staff. Whenever we had a matter that had to go to the general staff it was delayed, frequently not acted on at all, and items that were of vital importance to us were acted on by the general staff without coordinating them with our necessities.

Mr. LaGuardia. Was that the general staff in this country?

Mr. Satterfield. No; abroad. When I say general staff, I mean the general staff in France. It became necessary for us to organize ourselves very much as a large business corporation would be organized and to conduct our affairs very much as a business organization would be conducted, and we did so, and that was when we began to get results. There were a great many times there when we felt that the situation was almost hopeless, and it was not until toward the end of the war that we were working in a way that was satisfactory to ourselves. I do not know just how far you want me to go, Mr. LaGuardia.

Mr. LaGuardia. Col. Dunwoody testified yesterday and told us a great deal about the operations of your department in Paris, and with that as your basis, we would like to have your recommendations.

Mr. Satterfield. I have seen the New bill which was introduced in the Senate. I have read that carefully and believe that bill embodies a number of very valuable suggestions. There are many reasons why we should have a separate Air Service; one of them is that we may be able to operate our affairs under a responsible head and that we may control our own men as to promotions or demotions. One of the disadvantages that we operated under over there was

the inability to secure the promotions in the Army of the men who were carrying great responsibility. One of the most ordinary situations was that a captain or a lieutenant of unusual ability was in charge of a tremendously important operation, having reporting to him officers of higher rank. I think I am correct when I say that outside of the Regular Army there were only two promotions from the time we arrived in France in November until August of the following year. During that time, as I say, there were lieutenants in command of very large operations. I recall one instance, particularly, at the time I was in charge of the airplane and motor division, I was a captain, and I had reporting to me about 200 officers, including a number of majors, several lieutenant colonels, and one colonel, and about 3,500 enlisted men. After I was moved up to assistant chief of supply and relieved from duty as chief of the airplane and motor division, that was given to a first lieutenant, and he had command of these officers and men. You will see at once the difficulties that were created by an officer of that rank undertaking to control and operate so large and organization, containing officers of much higher rank.

So far as the efficient operation of our organization was concerned over there, there were, as you know, other agencies besides our own. There was the Navy and there was the Marine Corps that were also operating aviation services, and we were naturally more or less in competition with them on a number of items, and it was not efficient that we should be duplicating each other's efforts and competing for similar material. I refer particularly to the Italian situation which has perhaps been brought out at this hearing.

On the side of civilian aviation, I feel very strongly that we must have a separate department of the air which can coordinate all the air activities in this country. Under the present conditions, the Army is not giving and can not very well give cooperation and assistance to civilian aviation, but under a separate air department, which shall include all these branches, we can hope for such cooperation, and that is of the most vital importance, because the air service that we had during the war to a large extent has been disbanded and broken up.

A large number of the capable and efficient flyers and executive officers that we had are out of the service now, and the next time an emergency arises, we are going to find ourselves in exactly the position we found ourselves in before the war with Germany. I will not say exactly, but similar. The only way we can keep these men is to have a department which can offer them opportunities and inducements to keep them in touch with aviation and keep perfected in the service without actually taking them into the Army Air Service, and I believe that that is a matter of the most tremendous importance. I feel it very strongly because I have been intimately in touch with a number of the former officers that we had working with us in France, who have since come home and been discharged. Some of them have expressed a wish to remain in the Air Service, but it was not possible to keep them. They are now out and they are rapidly losing touch, and they are the men we would have to really get in any emergency that comes soon. If the emergency does not come until some time in the future, we have got to find the means of building up a new set of men, and the means will be

a separate air department, which can coordinate all the branches of aviation in this country.

Mr. FISHER. I notice you said a large number of officer flyers had left the service who ought to have been retained. Are you familiar with the fact that there are a large number of vacancies in the aviation service that could be filled now?

Mr. SATTERFIELD. I do not know the situation now; no, sir.

Mr. LAGUARDIA. Those vacancies exist now because the Secretary of War has issued an order not to appoint any more men to the Air Service at this time.

Mr. FISHER. I understand about that. That is just a temporary order.

I do not think you take into consideration also the fact that the question of Army pay is involved on the part of the young men who want to get out on that account rather than stay in the service. Did you take that into conideration?

Mr. SATTERFIELD. I think that in to be considered; yes, sir.

Mr. FISHER. I just did not like the thought that the War Department was to blame for all these reserve officers going out, or that it was due to the neglect of the Congress and the War Department to retain them, whereas, there is a bigger question involved, the question of Army pay and civilian opportunities which offer them a large increase in pay, and a great many of them are eager to get out. Those I have seen and have come in contact with are more than eager to get out and do not want to stay.

What have you to say in regard to the age of flyers? How long can a man continue as an active, efficient, combatant flyer?

Mr. SATTERFIELD. I think that depends very largely on the individual. I saw a man over 50 years of age learn to fly, and he did fairly well, but that is not at all the rule. The general rule is that the young men only are good, effective, combat flyers.

Mr. FISHER. You say young men; as we grow older we are inclined to change our ideas about young men. What do you consider a young man? How old would you say a man ought to be to be an efficient, active flyer, ready for an emergency?

Mr. SATTERFIELD. From 18 to 30.

Mr. FISHER. Then a great many of the young men who have been discharged are approaching 30, are they not?

Mr. SATTERFIELD. I do not know their average age, but I should say they would still have quite a few years before they would reach 30.

Mr. FISHER. But the blame as to letting all these men go is not altogether on the War Department. Is it not a question of a new policy of the Congress as to what is to be done with aviation? Do you not think the question is a new question and a constructive question for Congress to deal with, and not one of blame on the part of the War Department?

Mr. SATTERFIELD. I was not undertaking to blame the department. I was undertaking to say that the system which exists to-day did not provide for retaining these men under conditions which would be attractive to them.

Mr. FISHER. I am very much interested, and I think every member of the committee is in getting all the information we can as to what would promote aviation.

Mr. SATTERFIELD. Yes.

Mr. FISHER. We have been confronted with this situation, and while I notice from the witnesses in the room that we have some naval flyers here, the Army flyers who have testified, to a man, are for a separate air service, practically.

Mr. SATTERFIELD. Yes, sir.

Mr. FISHER. And they state that they find in their conversations with naval flyers that the flyers from the Navy and the Marine Corps, the ones they have talked with, are opposed to a separate air service. Can you account for that difference of opinion on the part of the flyers?

Mr. SATTERFIELD. I think the Navy flyers got better results than the Army did in many ways. I do not know about the Navy, and I should not like to testify about the Navy, because I was not in the Navy. I can only judge from hearsay; but from what I have heard, I conclude that the method of operation in the Navy was more effective, and more prompt, and more satisfactory than it was in the Army.

Mr. FISHER. This is such a big question that, as one member of the committee, and speaking for myself, I want to analyze it as thoroughly as I can, to see whether the bills we have before us answer the purpose, and if the Navy which, as you state, moved smoothly and successfully is opposed to it; I want to scrutinize very carefully the measures we have that are recommended by the War Department, as strong an enthusiast as I am of the work of the War Department.

Mr. SATTERFIELD. Yes.

Mr. FISHER. Have you examined the bills we now have under consideration—the Hull bill, and the Curry bill, and the New bill?

Mr. SATTERFIELD. I have examined the New bill carefully.

Mr. FISHER. But you have not had an opportunity to examine the Curry bill and the Hull bill?

Mr. SATTERFIELD. I have not examined the Curry bill, but I am informed it is very similar to the New bill.

Mr. FISHER. You are strongly of the opinion that for the improvement of the Air Service in all its different lines, we must have a separate Air Service?

Mr. SATTERFIELD. Yes, sir.

Mr. FISHER. I quite agree with you on that, but——

Mr. SATTERFIELD (interposing). And I will go further than that and say I believe the New bill is an excellent bill. I have not had an opportunity of seeing the other bills, so I can not say, but the principles embodied in the New bill are the ones that are right, in my opinion.

Mr. HULL. May I ask which one of the New bills you refer to?

Mr. SATTERFIELD. The Senate bill introduced by Senator New.

Mr. HULL. I know that, but there are two New bills. Does this one create a Cabinet position?

Mr. SATTERFIELD. It is Senate bill No. 3348.

Mr. HULL. Does it provide for a Cabinet officer?

Mr. SATTERFIELD. It creates a department of the air and a director of the air.

Mr. HULL. You have read the bill; does it create a Cabinet officer?

Mr. SATTERFIELD. I do not recall that it specifies it in that way.

Mr. HULL. That is a pretty big question, and a man ought to know about that if he has read the bill, and one of them does and one does not.

Mr. SATTERFIELD. I do not recall anything in the bill that states he shall be a Cabinet officer. If it is there I do not recall it. The bill states the head of the department shall be a director reporting direct to the President. In that case, he of course is not a Cabinet officer.

Mr. HULL. Do you believe he ought to be?

Mr. SATTERFIELD. Yes, sir.

Mr. HULL. Then you would create an entirely new service, and that is a tremendous proposition. If you propose to create an entirely new executive department, with a Cabinet member.

Mr. SATTERFIELD. Yes, sir.

Mr. HULL. You would have aviation separate from the Army and the Navy clear through; personnel and everything. Would you operate separately?

Mr. SATTERFIELD. Tactical operation should be under the control of the Army or Navy, as the case may be.

Mr. HULL. But how are you going to arrange all that. Have you thought of the tremendous difficulty there would be in bringing that about?

Mr. SATTERFIELD. Would it follow that the thing must be separated entirely, if he is a Cabinet officer?

Mr. HULL. No; not necessarily, but if you had an entirely new branch of government I can see where you would have all kinds of trouble and conflict unless you did separate them.

Mr. SATTERFIELD. I believe the thing should be separate and should be controlled separately, up to the point of tactical operation, and that then it should be absolutely under the control of the Army or the Navy, as the case may be. Unity of control is of course fundamental.

Mr. HULL. Well, it is a very large question, and it is very easy to say "We want this," or "We want that," and to think that that is a panacea for all our troubles, and yet when you analyze it and carry it out to its final analysis you find that you are in a whole lot more trouble than you had before. Have you thought that a separate executive department, not a Cabinet officer, but just simply a coordinating branch that would bring into harmony the three or four or five different branches of the Government in regard to air service, would be a better plan to start with than to try to do so much at one jump?

Mr. SATTERFIELD. I am inclined to agree with you. It is a very radical departure in any event, and if we can establish the principle of a separate department, later events may guide us better, perhaps, as to how far we should go. The main thing is to start the principle of a separate department which shall coordinate all the aviation activities. That is my thought in regard to the matter.

Mr. FISHER. If we are going to adopt a separate air service, you think it very advisable, do you not, that we should take into account the advantages that are promised by a separate air service, and also consider very carefully any handicaps that offer themselves in the way of proper cooperation on the part of the separate air service with the Navy and with the Army?

Mr. SATTERFIELD. By all means.

Mr. FISHER. You realize, do you not, that the Navy and the Army are essentially fighting machines?

Mr. SATTERFIELD. Absolutely.

Mr. FISHER. And if the Navy with an air service of its own moved off smoothly and functioned properly and effectively, before we adopt a system or service we ought to fully realize just what we are doing rather than do something that will throw a monkey wrench into a scheme that has moved so smoothly. Do you not think we ought to consider that very seriously?

Mr. SATTERFIELD. Yes, sir.

Mr. FISHER. I want to have your opinion on the proposition of the proper coordination, I mean, as a fighting machine, because that is what we spend all this money for. It is all spent for preparedness, so that in an emergency they can fight.

Mr. SATTERFIELD. Yes, sir.

Mr. FISHER. What do you think about the proper coordination between the Navy, which is dependent upon an air service in war, and the Army, which is dependent upon an air service in war, with a separate air service and its Cabinet officer functioning separately? That is the only hitch in my mind about a separate air service.

Mr. OLNY. May I elaborate on that and perhaps give you some information along that line? Yesterday, a representative of the Coast and Geodetic Survey testified showing wherein the airplane would be valuable in locating forest fires and in the extinguishing of forest fires, and in the locating of rocks below the surface of the sea through photographs in the air. Would not a united air man coordinate with representatives of each of those departments, like the Coast and Geodetic Survey and the Forestry Service, and like the Army and the Navy and the Post Office Departments?

Mr. SATTERFIELD. Yes, sir; I believe it could be done; and, in fact, it should and must be done. We must have coordination. At present we have a number of different technical services and sources of supply and matériel, training, etc., all working along similar lines, and it is only when they reach the actual employment of the matériel and personnel that their lines differ. By that I mean that the preliminary training, the educational work, the building of ships, and the securing of all the supplies and all that sort of thing, is the same for all the services up to a certain point; and that point comes when they go into tactical operations or into specialized operations, such as you have spoken of with reference to the Forestry Department, or the Coast and Geodetic Survey work or civil aviation, and so on, and to my mind it is a great waste to have this duplication of effort by the different services through the preliminary work, and I believe we can, with much greater advantage, coordinate this thing. Our experience during the war was that there was never enough of anything. I can speak more especially of the matériel side than I can of the personnel, because my work was matériel, and we never had enough of anything.

We were always trying to get more. We needed it, and at the same time we were trying to get material other agencies were trying to get the same material, and we were duplicating our stores, and we were duplicating our sources of supply, and each interfering with the other. I remember very distinctly that when the Liberty engine came out we were very much upset because we thought the Navy was

getting Liberty engines in excess of what they should get before the Army was getting them, and we wanted Liberty engines and needed them very badly over there. They meant everything to us, and when the first Liberty engine came out in quantity, we found out that the Navy was getting a large quantity of them, and we felt that that was wrong, and in fact it was wrong, that these two agencies cooperating for the same end should be pulling at odds on that source of supply. They should have been coordinated, and what was right should have been given to each service. I see no reason why this can not be arranged to coordinate all the activities in their essential functions.

Mr. FISHER. I think myself that if we are going to have peace always, there ought to be a separate air service. The doubt in my mind is whether or not in war they would cooperate as effectively as they would if they were just like they are now.

Mr. SATTERFIELD. We had one instance along that line. You speak of being at war. In France all the departments were buying for themselves, and a great deal of trouble ensued, and it was not until we put into effect the category system, by which certain departments were charged with the duty of buying materials in that category, that we were able to get together at all. We were in the peculiar situation of four or five or six different branches of the American Army going to the same French manufacturer and bidding against each other for the same material, each one not knowing that the other one was after it until he got there and found the other fellow bidding, and each not knowing what the other fellow was going to do with it, and why, and we were operating very inefficiently along that line until we established the category system. Now, if we can coordinate our aviation activities, all of them into one body, then we will avoid just such a condition as that, which in war became a very important matter. I speak of it because you spoke of it as a peace-time organization. It was war that forced this thing on us.

Mr. LAGUARDIA. That is all, Mr. Satterfield; thank you.

STATEMENT OF MR. CHARLES S. SHOTWELL, BUSINESS MANAGER MATERIAL DISPOSAL SECTION, AIR SERVICE.

Mr. LAGUARDIA. What position do you occupy?

Mr. SHOTWELL. Business manager of the Material Disposal Section of the Air Service.

Mr. LAGUARDIA. Can you tell us approximately how much surplus material Army aviation has to be disposed of?

Mr. SHOTWELL. They have declared about $40,000,000 of surplus. At the time of the armistice they had on hand about $90,000,000 worth of material left over from these contracts.

Mr. LAGUARDIA. Have you disposed of $50,000,000 worth?

Mr. SHOTWELL. $50,000,000 worth has been retained for future Air Service activities or transferred to other Government activities.

Mr. LAGUARDIA. And $40,000,000 worth has been disposed of?

Mr. SHOTWELL. $40,000,000 has been disposed of or declared surplus.

Mr. LAGUARDIA. How much of that have you disposed of?

Mr. SHOTWELL. We have disposed of about $17,000,000 worth.

Mr. LAGUARDIA. Can you tell us what percentage of value you have been realizing on that?

Mr. SHOTWELL. We have realized on the original war cost 67.4 per cent.

Mr. LAGUARDIA. Of the war cost?

Mr. SHOTWELL. Of the war cost.

Mr. LAGUARDIA. Was that net?

Mr. SHOTWELL. No; it has cost us 10.7 per cent to do business. That cost includes all salaries, office rent, warehouse rent, telephone and telegraph, light and heat, and all charges that are set up against the organization.

Mr. LAGUARDIA. Were you not way above that?

Mr. SHOTWELL. We had reclaimed 72 per cent of original war cost up to about six weeks ago.

Mr. LAGUARDIA. What has happened?

Mr. SHOTWELL. We have gotten away from our cream.

Mr. LAGUARDIA. What do you suppose it will average?

Mr. SHOTWELL. I think we will be able to dispose of it at not below 60 per cent as an average.

Mr. LAGUARDIA. So you think you will get from $20,000,000 to $25,000,000 from your $40,000,000 worth of supplies?

Mr. SHOTWELL. Yes, sir.

Mr. LAGUARDIA. I want to ask you another question in regard to the reclaimed values. The cost of the materials has gone down a great deal. We are selling all our metals at market prices and getting the average market prices for them, but that is only about 80 per cent of the war cost for the same materials. In other words, they have gone down about 20 per cent. While steel has not gone down a great deal, steel had to be bought under conditions that forced us to pay a premium over the market at that time. Of course, we have that to operate against in making up our figures.

Mr. LAGUARDIA. How long a time do you suppose it will take to dispose of the remaining portion?

Mr. SHOTWELL. I think it will take probably about three months.

Mr. LAGUARDIA. And you expect to realize about $20,000,000 from the $40,000,000 worth of property?

Mr. SHOTWELL. Yes, sir.

(Thereupon the committee adjourned to meet tomorrow, Thursday, December 11, 1919, at 10:30 o'clock a. m.)

SUBCOMMITTEE ON AVIATION
OF THE COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Thursday, December 11, 1919.

The subcommittee met at 10.30 a'clock a. m., Hon. Fiorello H. LaGuardia, presiding.

The following members of the subcommittee were present: Representatives Hull, Olney, and Caldwell.

STATEMENT OF MR. G. C. LOENING, 351 WEST FIFTY-SECOND STREET, NEW YORK CITY.

Mr. LAGUARDIA. Mr. Loening, what is your address?

Mr. LOENING. 351 West Fifty-second Street, New York, N. Y.

Mr. LaGuardia. And what is your business?

Mr. Loening. Aircraft constructor and engineer.

Mr. LaGuardia. Are you connected with any manufacturing concern?

Mr. Loening. Yes; my own concern manufactures machines for the Government and subcontracts any quantity of production.

Mr. LaGuardia. What is the name of your company?

Mr. Loening. The Loening Aeronautical Corporation.

Mr. LaGuardia. Have you produced any planes?

Mr. Loening. Yes.

Mr. LaGuardia. Of what type?

Mr. Loening. In my experience as an aeronautical engineer for some 10 years, I have produced about 26 experimental types of planes. The most recent one is the two-seater monoplane which, at the conclusion of the armistice, was the best performing two-seater in the world.

Mr. LaGuardia. Mr. Loening, do you believe the manufacture of airplanes will be simplified and improved and reduced in cost if all the governmental activities in aeronautics are placed in a central department of aeronautics?

Mr. Loening. I do, as far as production is concerned. I believe the history of the Aircraft Production Board itself shows that. I do not believe that the technical development of airplanes at their very start, of new designs, will permit of economy if united under one head, because the intimate relation of the operation side of the business that requires these new designs requires the most direct action possible to the designing, and the more different steps that goes through, the more inefficient it becomes.

Mr. Caldwell. In other words, you think as far as experimentation is concerned, the more heads you have the more intimate contact they would have with the experimentation itself, and therefore greater progress would be made.

Mr. Loening. Yes, sir; I do. As a matter of fact, I believe if it was possible for the operations parts of the service to build their own machines in the back yard back of the hangar, they would at least get what they want. They change their minds continuously, and justifiably so, because the conditions change, and it is very difficult to follow those things through an elaborate organization. I believe a united air force organization itself would, after a while, have separate departments exactly as it is now. The only difference would be that the heads of these technical divisions would not have the authority. When we come to production I think there is no question whatsoever but that the uniting of these activities is not only economical but very necessary.

Mr. LaGuardia. What is the present state of the aviation industry in this country?

Mr. Loening. I believe the committee has been told frequently that the industry is starting badly. It is, in a way, and yet I think we must admit that there is some business. We are receiving business from the Navy Department and Mr. Glenn Martin and Mr. Voight will support me, I am sure, in the statement that the Navy has followed the desires of Congress by making its appropriation available for construction in quite an efficient way, which we can not

deny. We have no business, or very little business, from the Army. My own experience with the Army Air Service is such as to convince me that it is quite hopeless, and absolutely necessary, whether by means of a separate or new department or some other way, to completely reorganize its activities as far as the industry is concerned.

Mr. CALDWELL. You say the conditions in the Army are quite hopeless. Will you please elucidate that so we can understand whether you are charging something against the department or whether you have something else in mind?

Mr. LOENING. I am stating all this from the technical standpoint and on the basis of my experience, and can not endeavor to go into the matter from the standpoint of uniting the Army and the Navy air services as a military proposition. I can not consider that, because it is not my business, but from a technical standpoint I find, for example, at present that in the organization of the technical work of the Army as conducted at McCook Field, we designers are competing with designers, and that the Army is endeavoring in that organization to design its own airplanes, to the great detriment of developing the originality of the industry.

Mr. LAGUARDIA. And you believe that injures the industry?

Mr. LOENING. I do.

Mr. LAGUARDIA. To what extent?

Mr. LOENING. To the extent that the money that is made available by Congress for this work is used more inefficiently than it would be if it was spread out among the industrial designers. The cost of the new designs at McCook Field, I believe, would be found to be some three or four times greater than in a civilian enterprise.

Mr. CALDWELL. For instance, about what does it cost?

Mr. LOENING. I am acquainted with one machine recently developed at McCook Field, and have been informed that its cost has been some $120,000.

Mr. CALDWELL. Now, you had some experimentations at the beginning of the war with steel frame construction, did you not, Mr. Loening?

Mr. LOENING. Yes, sir.

Mr. CALDWELL. How much of the Government's money did you get in that experimentation?

Mr. LOENING. About $50,000.

Mr. CALDWELL. And what happened to your plane?

Mr. LOENING. The Government turned it down because of the fear that steel would crystallize, and only three weeks ago Gen. Mitchell asked me whether or not we would again consider reviving that development.

Mr. CALDWELL. But did you not fly it and did it not break down in the air?

Mr. LOENING. It did not.

Mr. CALDWELL. What happened? Was there not somebody killed in your machine?

Mr. LOENING. No, sir.

Mr. CALDWELL. Did you not make a steel machine on the T-bar plan?

Mr. LOENING. Yes, sir; and nobody was ever killed and no serious accident was ever had in it.

Mr. CALDWELL. Did it ever fly?

Mr. LOENING. Yes, sir.

Mr. CALDWELL. But that was $50,000 spent for that work and we did not get anything.

Mr. LOENING. Yes, sir; you did. You got so much that the authorities at the present time are desirous of going back to it and that was three years of development.

Mr. LAGUARDIA. Mr. Loening, the industry would not object to suggestions from technical bureaus as to designs?

Mr. LOENING. Not at all. What is necessary is to consider this development of new types of aircraft as a professional matter in which the Government employs designing engineers just as architects or doctors would be employed, which at once brings us to the consideration of the Government's method of having to do business in this connection which is on the basis of giving contracts to the lowest bidder. I do not believe that this basis, which the Army and the Navy have to follow, is at all the right one at the present time, because, as a matter of fact, if you compare this professional work to that of a doctor or an architect, you do not employ the cheapest doctor, you employ the best.

Mr. LAGUARDIA. Then, you do agree that production, at least, should be united under one department.

Mr. LOENING. Yes, sir.

Mr. LAGUARDIA. And beyond that you do not care to make any suggestion.

Mr. LOENING. And possibly training. I might add one more, certainly all rules and regulations of the air.

Mr. LAGUARDIA. Would not the industry benefit by the establishment of a chain of landing fields throughout the United States.

Mr. LOENING. Yes, sir; and that brings me to suggest that in the several days I have been here attending the hearings, I have gotten the impression that the needs of commercial aviation are being hitched to the Army and to the Navy kite, and I think it ought to be the other way around.

Mr. LAGUARDIA. No; we have just had the Army and the Navy representatives testifying. To-day is the day for civil aviation, and we would like for you to give us any suggestions you have in mind.

Mr. LOENING. We have certain clear steps that must be undertaken immediately if we are to develop commercial aviation. The first one is the establishment by the Government of landing fields and the development of wireless-control stations in the United States, which, in themselves, will invite a great deal of attention to civilian flying, and probably be the greatest single step in developing civil aviation. Obviously, due to the expense, this must be done by the Government and requires a department specifically for that purpose. In addition to that, there is no doubt that the Government could establish an air university and research bureau for all air activities, which would be very beneficial. In addition to that, some department of the Government not now existent, must be created that will license aircraft as elevators are licensed, and that will license pilots, a function that is now done by a civilian organization that is not generally recognized as representative, namely, the Aero Club of America. We then go a step further in giving consideration to commercial aeronautics, and I would point out that the operations of commercial aeronautics is really going to consist of three parts, the con-

struction of machines, the operation of machines, and the maintenance of machines.

In the past, the legislation that has gone through and the manner in which the Army and the Navy have had to conduct their business, have taken away from the industries the opportunity to work on two of these three parts, namely, operation and maintenance, with the result that as we stand to-day, except in the case of a small amount of private flying, the aircraft industry in this country does not fly. If the establishment of a commercial department of aeronautics, this same condition of operation and maintenance by the Government is to continue to exist, I do not think that the real big development of commercial aviation will have been provided for. We have many instances of that, and perhaps, one would clear it up for you. The 300 Hispano motor which was developed for the Government has never yet been tested in the air by the constructors sufficiently, although they have tried every means of having it so tested, the reason being that when these new types of aircraft are built, they are so urgently needed by the Government that they are immediately taken over, and the constructor and the motor builder never get a chance to know what their actual operation is. The Government is not at fault here. All information that can be gathered is promptly submitted to the manufacturer; at the same time the system is at fault. The industry does not operate.

Mr. LAGUARDIA. Could that be consolidated?

Mr. LOENING. Yes.

Mr. LAGUARDIA. How?

Mr. LOENING. By having a commercial aviation department that does not operate, but that buys from the industry not only aircraft but operation of aircraft, such as commercial mail, and even to the possibility of carrying passengers and the establishment of passenger lines owned by the Government but operated by the industry.

Mr. CALDWELL. In other words, you think we ought to establish an air service on the basis of heads I win and tails you lose, so that the commercial industry will prosper regardless of whether the Government gets anything or not.

Mr. LOENING. No, sir; I do not think we can lay down any definite rules in the matter. I think the large amount of conflicting and vague testimony that the committee has gotten is absolutely natural. This whole business is so new that even the most expert of us, with a lot of experience, have very few facts that we can draw upon which, when analyzed, are not illusive and of such a nature that the judgment that must be based upon them is largely guesswork, which at once brings up the question that if an air service is established and the right air director is appointed, the whole thing will become very successful, but if the wrong air director is appointed, it will take many years for him to learn his mistakes, which, in turn, means that any legislation now contemplated must be of such a nature that it will back up any new organization a long enough time to permit it to learn how to overcome its mistakes.

Mr. CALDWELL. We were treated to this kind of a discussion about the method of promoting commercial activity in the preparation of war material for a number of years prior to the war. At the head

of the Ordnance Department was that great and wonderful technical man, Gen. Crozier, who maintained that the Government plants should be shut down in order that the moneys available could be spent in private enterprise, in order that the private organizations would be ready to take care of us when war came, and notwithstanding the appropriations made by this committee to be spent in certain ways, the moneys were technically diverted to other sources and spent with private individuals, and when we got into the war we found that not only had they failed to do what we hoped would be done and what the commercial people had urged would be done, but that even the Du Pont Powder Co. was unable to meet the requirements of our Government, and that the Government had to establish powder factories of its own; we had to build arsenals of our own, and we had to take our own plants and expand them, and expand everything else.

Do you not think we would find exactly the same condition here, if we threw away or shut down all the Government plants that we have spent millions and millions of dollars for, or even let them stay idle, for the purpose of developing private industry? Do you not think we would have exactly the same condition in this industry that we had in the other?

Mr. LOENING. Possibly, but if it is the desire of this committee to develop commercial and private industry, you will not do so if you do not open it up to private and commercial industry.

Mr. CALDWELL. There are two ways to develop private industry; one is to subsidize it and the other is to open it up and give it freedom; which do you think ought to happen?

Mr. LOENING. I am not familiar with the working of subsidies, as I do not believe any industry in this country has ever been subsidized.

Mr. LAGUARDIA. That is all, Mr. Loening; thank you.

STATEMENT OF MR. C. M. KEYS, VICE PRESIDENT OF THE CURTISS AEROPLANE & MOTOR CORPORATION, 60 BROADWAY, NEW YORK CITY.

Mr. LAGUARDIA. Mr. Keys, you were a member of the Crowell Commission?

Mr. KEYS. Yes, sir.

Mr. LAGUARDIA. And you concurred in the Crowell report, which is a part of this record?

Mr. KEYS. Yes.

Mr. LAGUARDIA. Do you believe the manufacture of airplanes will be simplified, improved, and reduced in cost if all the governmental activities in aeronautics are concentrated in a special department of aeronautics, headed by a civilian director?

Mr. KEYS. I would not put operations under a civil director. You can not put Navy and Army operations under a civilian director.

Mr. LAGUARDIA. As the head of the department, the Secretary of the Navy now is a civilian, is he not?

Mr. KEYS. Yes; but it is a military function, and if you make another military organization out of a central air service, I think you will lose the benefit of such an organization.

Mr. LAGUARDIA. What is your suggestion?

Mr. KEYS. Leave operations out; leave special detail training of a technical sort out. You have to, I think. Apart from that, I would put technique under a central service, as it is in England, France, and Italy now.

Mr. LAGUARDIA. And training?

Mr. KEYS. Training under the point where training begins to split off into branches. For instance, a man has to be especially trained to be a naval spotter.

Mr. LAGUARDIA. And for artillery direction also.

Mr. KEYS. Up to that point I would put all the training together.

Mr. LAGUARDIA. And the art of flying and fighting in the air?

Mr. KEYS. The art of fighting in the air would come as special Army training, I think. Of course, I am not an Army man, Mr. LaGuardia, and I do not know how the results are best achieved in military training.

Mr. LAGUARDIA. Do you believe that commercial development of aircraft will be expedited and developed by the adoption of a united air service?

Mr. KEYS. Unquestionably, if that service is wisely established and you look to precedents. Every nation has made great mistakes in the establishment of their present system of controlling the air business, and those mistakes you can avoid by simply looking at them.

Mr. LAGUARDIA. And, judging from those mistakes and from the experience of others, you think the proper policy to pursue now is the creation of such a department?

Mr. KEYS. There is no doubt in the world about it.

Mr. LAGUARDIA. Do you believe the aeronautical industry in the United States will need a direct subsidy in order to make proper and satisfactory advancement?

Mr. KEYS. No; I do not think the industry needs either direct or indirect subsidy.

Mr. LAGUARDIA. What does it need?

Mr. KEYS. It needs, undoubtedly, the establishment of flying fields under the Government. It needs pretty broad and intelligent assistance from the Government, in working out its problems, but I do not believe it needs the appropriation of any money by the Government from which the Government will not look for a direct return.

Mr. LAGUARDIA. Have we advanced as rapidly as England and France in aviation since the armistice or have we developed the industry as well?

Mr. KEYS. I saw France and England in July. There had been no development in either France or England on a large scale except in motors. I do not think there has been any advanced types of planes brought out in either France or England during that time.

Mr. LAGUARDIA. Have they produced more?

Mr. KEYS. They were going on with Government contracts to some extent, France particularly. The French aviation industry has paid no taxes since the beginning of the war in 1914, and if the French Government had chopped them off shortly at the time of the armistice as we were chopped off, for instance, the Government never would have had any kind of chance to get any of its back taxes or any other taxes. They were all doing business on Government

money. France, of course, was at war from one end of the country to the other while we were not, because we were only in it a short time, so you could not compare the production results. We had, of course, the largest airplane contracts here when the armistice came along, and the Army wanted us to go ahead and build a certain number of SE-5s, which is a war machine. I came down here on the 25th of November and said, "I do not want to build any war machines; is this intended to keep us open or does the Government want them?" We had a debate with Mr. Potter about it, and it appeared that it was a little of each. I asked for cancellation of all our orders; that is, for the closing of all our orders and all our orders were closed, so that we built and delivered for the Army, I think, no war machines after the armistice. Now, if they had done that in France they would have wrecked the industry, unquestionably, from my view in looking over the industry and I looked over it pretty carefully, and Mr. Houston and Mr. Martin were over there, and I think will concur with me, so they have gone on with production both in England and France.

Mr. LaGuardia. Is your company turning out anything?

Mr. Keys. Yes; commercially.

Mr. LaGuardia. You have your plants going?

Mr. Keys. We have the Churchill Street plant, the small plant in Buffalo, going, and the Curtiss Engineering Co.'s plant at Garden City is running about 50 per cent.

Mr. LaGuardia. Mr. Keys, will you tell the committee how long it would take, under present conditions, to get a new plane in production, assuming you simply had the model and no working plans.

Mr. Keys. The model and no drawings?

Mr. LaGuardia. Yes.

Mr. Keys. With the motor in production?

Mr. LaGuardia. Yes; we will assume the motor is in production.

Mr. Keys. With the motor in production I would say we would begin production somewhere between six and eight months.

Mr. Caldwell. What is the character of the planes you are making now for commercial use?

Mr. Keys. We are building a type we call the Sea Gull; it is the old flying boat, only instead of 110 horsepower motor, we have put in a 150-horsepower motor, and make it a three-seater. It is a pleasure boat.

Mr. Caldwell. What kind of a motor?

Mr. Keys. The new Curtiss motor. That has been a development.

Mr. Caldwell. It is more or less of a pleasure boat.

Mr. Keys. It is a pleasure boat and sells for about $10,000.

Mr. Caldwell. And is used largely for men who are in the business along the seashore at the resorts?

Mr. Keys. Yes; at summer places and so on. There is a good little market; of course, it is all very little, but you have to look at the industry now as a very small thing.

Mr. Caldwell. And in this development you lay more stress on the dihedral angle and making it more stable than during the war?

Mr. Keys. We are using practically the same dihedral as in the latest type of small flying boats delivered to the Navy. We have not changed the stability on the boat. You know the way it hangs.

Mr. CALDWELL. That adds to the stability, whereas the land machine would not have the same amount of stability.

Mr. KEYS. No; it would not.

Mr. CALDWELL. Are you making any land machines?

Mr. KEYS. Yes; the type we call the Oriole, which is in demand on a small scale and will be in fair production along about April or May. That is a small machine with 150 horsepower Curtiss motor, for which there looks to be a reasonable demand. I think we are putting out, at the outset, 300 of them into production and will possibly run to 600 during the year.

Mr. CALDWELL. And you expect to get a market for them from whom?

Mr. KEYS. From the public.

Mr. CALDWELL. That is, from men who fly for pleasure like the pioneer automobiles.

Mr. KEYS. Yes; like the pioneer automobile, only it had not the chance that the original pioneer automobile had. Please do not misunderstand me when I am talking about this production. The Curtiss Aeroplane & Motor Corporation last January, when its board of directors met, I proposed a complete liquidation of the Curtiss Aeroplane & Motor Corporation, to get out of the business. We could have done it at that time very nicely, and we should have done it, but various people, particularly in Washington, and some of our own people, said, "Well, I think we had better go on and see what we can do." At that time the Canadian Government had sold a large amount of Curtiss JN machines made in Canada to Mr. Giffin's firm, who brought them into this country and was selling them at a low price. We saw we could not build any machines to sell in competition with them, and it did not look possible to go on, so there was good reason to liquidate. The United States Government came into the market with some JN's, quite a lot of them, and Standards, and a lot of stuff, second-hand mostly, and at that time I said, "If you can get this stuff on a basis where we can anywhere near compete with the Canadian stuff or with any British stuff which is sure to come in,"—we figured at that time we would have a great flood of stuff from the other side—"we ought to stay in business and so I think we can live on that."

The finance committee went into the matter very thoroughly, and I made a report that I thought it would cost us $1,000,000 cash to stay in business for one year, and we went ahead after a lot of debate, and it took a lot of nerve to spend $1,000,000 in a company that had never paid a dividend on its common stock, and its common stock is practically worthless—$11 or $12 a share—scattered all over the country. Its preferred stock had never been an investment security. It took a lot of foolishness, I thought, in a sense to appropriate any money to spend so as to keep the art alive, but that is what we determined to do and that is what we are doing. We have not quite spent the $1,000,000, but we are very near it in our operations this year. Our losses to date are somewhere near $750,000. That is subsidizing an industry out of your own pocket, and you can not go very far on that.

Mr. CALDWELL. If that is a fair illustration of what the others are doing, what is going to become of the industry in another year?

Mr. KEYS. You know, Mr. Caldwell, there was a question in our minds as to whether there was any such thing as a commercial aviation industry. We had to find out, and it cost money to find out whether there was any industry, and we just decided we could stand it up to a certain point, without being sued by our stockholders or criticized publicly or getting into trouble with our directors and the owners of the corporation. I agreed, and all the other men on the board of directors who own stock in the corporation agreed, they would not sell any of it during that year, so that took our own protection away from us, and we went in to see whether there was a commercial demand in this country. Well, it cost us $1,000,000, and I do not know to-day whether there is such a commercial industry or not. We know there is some demand for airplanes, but to make airplanes in small quantities and sell them at prices any man will pay for an airplane has got to show a margin of profit, or else there is not an industry, and we do not know that yet.

Mr. CALDWELL. How about these big machines that were made and brought down here for demonstration purposes?

Mr. KEYS. The Eagle?

Mr. CALDWELL. Yes.

Mr. KEYS. That is a design built in Garden City and designed in Garden City. We have our own department of design there and had it all through the war. The Army did not want anything to do with it because it had a large force of aviation engineers in it. I think that was the main reason. We designed the Eagle down there and built it, and it is an experimental machine. We are building, I think, six of them now, five or six of them.

Mr. CALDWELL. Do you expect to establish a passenger service?

Mr. KEYS. No; that is a branch of the industry I do not want to go into. We do not want to go into transportation because we would be competing with ourselves to some extent, and then other people will not go into transportation because they will say the Curtiss Co. itself is engaged in the transportation business.

Mr. CALDWELL. Are they on sale or on order?

Mr. KEYS. I think two of them are on order; from our own agencies, however, and they expect a sale, of course, otherwise they would not order them because they put up a deposit. The other is experimental building. That design is not complete. We built that with three motors—did you fly in it?

Mr. CALDWELL. No; I wanted to but I did not have the opportunity.

Mr. KEYS. It is a pretty safe machine because it has certain factors of safety through the multiple motor-power plant. We built that machine with three little motors. We are building it now with two 375s, expecting, of course, naturally good deal better results from a flying point of view, and possibly an equal factor of safety in view of the fact that it will fly very well with three-quarter throttle; that is, with the motor not opened up. We are carrying on those experiments. I think we have six designs in one stage or another in design now. That is very expensive business, of course, and it costs a good deal of money. You have got to have a lot of nerve or else a lot of money that you do not know what to do with to stay in this industry at the present time.

Mr. CALDWELL. You had to have considerable nerve to start in the industry in the beginning, did you not?

Mr. KEYS. The crowd who are really running the Curtiss Co. now are not the crowd that really started that industry. The industry started on the side of the road with $5,000 or $10,000, and grew up from that.

Mr. CALDWELL. Yes, I remember the old bamboo machine that they built first.

Mr. KEYS. Yes; but the Overland people own the control of the Curtiss Co. to-day. I sold it to them in the summer of 1917, because it was necessary; in fact, we were told down here we would not get any business unless I strengthened that company up, and I put on its board of directors a lot of money to strengthen it up and sold the control of it to the Overland people, which made it strong enough to go through the war.

Mr. CALDWELL. Who told you that?

Mr. KEYS. Well, I would say if there is any one person who could be quoted on it would be Col. R. L. Montgomery, of the Aircraft Board, and they were right, Mr. Caldwell; that is to say, if we were going to get any important manufacturing business from the Government, we ought to have had a stronger company than we had. That company in the winter of 1916 was very feebly; in fact, it was on the verge of collapse, handling British contracts. I went into it at that time and saved it from bankruptcy at that time, and I ran it from January, 1917, until June myself, except the operations, of course.

Mr. CALDWELL. The British paid good prices for their stuff, did they not?

Mr. KEYS. For their material?

Mr. CALDWELL. Yes; that is, the stuff they bought from you.

Mr. KEYS. We got good prices?

Mr. CALDWELL. Yes.

Mr. KEYS. I do not know. I do not think so, not particularly good.

Mr. CALDWELL. You were practically the only market they could go to, were you not?

Mr. KEYS. We were selling the JN, new, with motor at $8,000, the same price the British Government paid, and a good deal cheaper than the British Government could buy in England. I think American prices all through were way below the same prices the British paid elsewhere.

Mr. CALDWELL. You said you were in bad shape while you were executing British contracts, which was surprising to me, because I thought you were in good shape on that work.

Mr. KEYS. Mr. Hoskins can tell you why we were not. He was general manager of the Curtiss Co. at that time.

Mr. CALDWELL. I do not want to inquire, of course, into your personal business affairs.

Mr. KEYS. It was a mixture of production and experiment all mixed up together in the one plant, and that never is profitable in any industry, so that they were in very bad shape, and I think the Government was quite right in telling us that we ought to be stronger than we were. We got $2,000,000 cash in July into the company through our common stock, and we discussed that with Col. Mont-

gomery and several others down here, and they agreed that was a very wise thing to do. The stock sold at $35 a share.

Mr. CALDWELL. If we determine to consolidate, as I gather it from your original statement—and by the way I want to state here that I like your point of view very well—your idea would be that the consolidation should not in an way affect the military or naval use of the airplane.

Mr. KEYS. I do not think it should.

Mr. CALDWELL. And the thing the Government ought to do is to have some sort of an organization that would supervise the control of commercial activities in the air.

Mr. KEYS. Yes.

Mr. CALDWELL. In other words, the laying out of lines and avenues, stratas and places where the aircraft should operate, the times and methods by which there should be inspection of machines, etc.

Mr. KEYS. Yes.

Mr. CALDWELL. Just as you inspect any other kind of machine that would be dangerous to human life for use as a quasi-public thing.

Mr. KEYS. Yes.

Mr. CALDWELL. Do you think that this plan ought to control the mail service.

Mr. KEYS. Oh, yes.

Mr. CALDWELL. And the Reclamation Service or the Forestry Service and all that sort of thing?

Mr. KEYS. On the question of the operation of those services, Mr. Caldwell, I do not want to express an opinion as to whether a central air service should control operations at all, but on production and technique, I think, unquestionably, they should. The question of operations I really have not thought about closely enough, closely as I followed it in Europe.

Mr. CALDWELL. But you think it ought to be more or less unified in the matter of production.

Mr. KEYS. Production and technique.

Mr. CALDWELL. Do you think it would injure the commercial enterprise of manufacturing or producing aircraft, if, along in conjunction with your activities, and when I say, "Your," I mean the people in the commercial business, the Government would operate, at a small percentage of their capacity, the plants it has already purchased: do you think that would injure your private enterprise?

Mr. KEYS. If the Government has production plants at all, the industry must be organized to go on with absolutely no governmental business, I would say, because if you have production plants at all, under one régime or another, Government business will all go into those plants.

Mr. CALDWELL. It did not do it with the rifles we used in our Army or with the pistols we used in our Army or with the powder we put in our shells, and it has not done it with the automobiles we have used or anything else. Is there anything peculiar to the Air Service where you would find that the operation of a Government plant, that we already own and have spent the people's money for, and are now paying guards to protect—is there anything peculiar in your service that would imperil it by the Government operat-

ing these plants at a percentage of their capacity. I do not mean their full capacity at all.

Mr. KEYS. If there should come a year when the Government—the Army, and the Navy, and all other departments—only bought 50 airplanes or 150 airplanes it would all go to the Government's plant.

Mr. CALDWELL. Under a tentative bill that this committee is about to report, we are providing for 16,000 officers in the aviation branch of the Army, and that does not include anything for the Post Office Department or the Interior Department, or the Navy Department. Would that fact seem to throw any light upon the subject as to whether or not we could run our plants on a small percentage basis, while you are running yours, without destroying them?

Mr. KEYS. At the present moment I would say that all the indications are that the operation of Government plants on a small scale would not make any difference at all, and actually, Mr. Caldwell, I think the Government has got to have——

Mr. CALDWELL (interposing). I was just asking that question for the benefit of the Colonel here, because I had a conversation with him last night along that line, and I thought that would be your answer.

Mr. KEYS. I think the Government has got to have some plants.

Mr. CALDWELL. Of course, it has, and it has to operate them or let them go into disuse.

Mr. KEYS. The British operate a plant. That is operated as a technical division of the British aviation, and they need it.

Mr. CALDWELL. And, as a matter of fact, if the Government's plants were operated in a friendly spirit toward you it would be an assistance rather than a hindrance.

Mr. KEYS. I do not think it would hurt us.

Mr. OLNEY. Mr. Keys, you have orders to-day from private industry; are they sufficient to encourage you to go along and operate your plants on a basis of about 50 per cent?

Mr. KEYS. Our very small plants; yes.

Mr. OLNEY. Could the pleasure aircraft that are ordered by your agents be converted into war machines?

Mr. KEYS. The Oriole would make a fair training machine, but it is a three-seater. The Seagull would make a fair training boat, but it is a three-seater also. They are very similar to the training types of Army and Navy machines except they are made to carry more people.

Mr. OLNEY. The Curtiss plant was practically, or to a certain extent, sudsidized during the war, was it not?

Mr. KEYS. No; I do not think so. In what way?

Mr. OLNEY. It received certain assistance from the Government?

Mr. KEYS. Oh, yes; we got advances on our production contracts. We did $88,000,000 of business during the war and our own capital was far too small to do that, and we had no credit worth while at all with the banks or anywhere else, and the Curtiss Co. could hardly have carried on that amount of activity without advances. We got advances from the British Government, first, $2,200,000.

Mr. OLNEY. Which you returned?

Mr. KEYS. Yes; which was paid. We got advances from the Navy, and I remember coming down here in December, 1917, and

negotiating for $11,900,000, and I got it, and that was all paid back, principal and interest. $3,900,000 of that $11,900,000 was advanced from the Navy. We had small advances of $300,000, or something like that, but they amounted to just 25 per cent of the contracts in force, under a law that was put through, and it was all repaid. It was just like borrowing from the bank, only the Government wanted a mortgage on everything and got a mortgage on everything, patents and everything else. I do not think it was subsidized. A subsidy is money paid by somebody without an expectation of a direct return.

Mr. OLNEY. Yes; the same as a subsidy for the mail.

Mr. KEYS. Yes, sir; that is a different thing. Lending money to a corporation is not a subsidy. I do not believe in subsidies in this country. I think you would kill the industry if you subsidized it.

Mr. OLNEY. I understand your position to be that operations should be carried on by the Navy and the Army and the Geodetic Survey, etc., separately, with a united air force.

Mr. KEYS. I will give that as an offhand opinion, and I will say it is not carefully thought out in detail.

Mr. OLNEY. And that service would acquire materials and act in an advisory capacity to the branches under it?

Mr. KEYS. Yes.

Mr. LAGUARDIA. Mr. Keys, you seem to be rather pessimistic this morning as to the future of commercial aviation.

Mr. KEYS. I do not think there is much future in commercial aviation. That view is not shared by all the people in the Curtiss Co. We have two or three enthusiasts, thank goodness, because if we had not we would shut up to-morrow.

Mr. LAGUARDIA. The purchase you made of your planes and the standards after the war made you money?

Mr. KEYS. We have lost money on it so far.

Mr. LAGUARDIA. I have been trying hard to rescind that contract on the part of the Government, and if you will help me, maybe you will do it.

Mr. KEYS. We may give you an opportunity next week to entertain a proposition to rescind it or what is left of it.

Mr. LAGUARDIA. Of course, you realize that if all airplane factories were to liquidate now and go out of business, this country would be in a pretty bad fix in time of emergency, would it not?

Mr. KEYS. Oh, yes. I covered that point, as well as I could, and went into it pretty thoroughly in my testimony before the Senate Military Affairs Committee, and I expressed the opinion that looking at it from the standpoint of getting back into a war industry we could do it possibly as quick as England could, because, for instance, the plant at Buffalo is full of material, but if you had to clear it out you could take that stuff out and burn it in 30 days, although, of course, you could not take it away or transport it in 30 days.

Mr. LAGUARDIA. Then it would take at least 30 days more just to get the machinery going without producing a thing.

Mr. KEYS. It would be six months before you would produce anything, but England is in the same position.

Mr. LAGUARDIA. But England is producing now?

Mr. KEYS. On a very small scale; not on a war scale. I am talking about getting back to a war scale.

Mr. LaGuardia. But England is producing more than we are.

Mr. Keys. Oh, yes; no doubt.

Mr. Hull. I would like to ask Mr. Keys in regard to the commercial prospects of aviation. I presume, he has touched a little on it, but I was delayed in getting here this morning. I think his view is pretty nearly mine. You say you do not see very much in the commercial side of the airplane at the present time.

Mr. Keys. I see that quite a lot of planes will be wanted in this country but whether they will be wanted at the price at which they can be produced in this country, without a loss, I doubt.

Mr. Hull. Are not those wanted more for what we would call a sporting proposition than a real commercial proposition.

Mr. Keys. Yes.

Mr. Hull. There is at present practically no commercial demand for the airplanes, is not that true?

Mr. Keys. That is true.

Mr. Hull. And everything we have considered or talked about as a commercial project is really more of a sporting proposition or experiment, such as the Post Office Department is conducting at the present time.

Mr. Keys. That is correct.

Mr. Hull. You say you object to the word subsidy, and perhaps that is not the proper word, is it your idea that the Government ought to foster the industry by giving what they call educational orders; is that your idea?

Mr. Keys. No; I do not think the Government ought to buy any airplanes it does not want. I do not care what they are. I do not think it is necessary. They ought to buy machines only when they want them and they ought to pay what they are worth and not any more.

Mr. Hull. The cost of production?

Mr. Keys. The cost of production plus a reasonable business profit.

Mr. Hull. Should they distribute these orders among several manufacturers, or under the circumstances would it be better to centralize and practically build up an industry that you could depend on, instead of trying to build up one that perhaps if you did not buy a large number of planes next year would be famished, and practically put out of business.

Mr. Keys. I do not think you ought to depend on one manufacturer. I think you ought to have more than that.

Mr. Hull. Well, say, two.

Mr. Keys. I think you ought to have quite a little group.

Mr. Hull. How much money do you anticipate the Government is going to spend on this proposition.

Mr. Keys. I have not any idea. I will say this, that the Government will not have an Air Service without appropriations a good deal better than were made in 1919. On the other hand, I think the Government would be very foolish to contemplate any such expenditure as went through in 1918, for instance, on a war basis. I think it should be somewhere in between.

Mr. Hull. We appropriated how much in 1919?

Mr. Keys. $25,000,000 for the Army.

Mr. Hull. And how much for the Navy?

Mr. Keys. And $25,000,000 for the Navy.

Mr. HULL. How much for the Post Office?

Mr. KEYS. I do not know. Did they have a direct appropriation?

Mr. LAGUARDIA. $850,000.

Mr. HULL. I think they had a direct appropriation, but it was small.

Mr. CALDWELL. Then the Interior Department has an appropriation.

Mr. HULL. I did not know but what you had that information.

Mr. KEYS. I will say this, that as far as I know since the armistice, neither the Curtis Aeroplane & Motor Corporation nor the Curtiss Engineering Corporation has received any orders whatever from either the Army or the Navy, except a recent order to change over 47 DH's, which was a little matter of $60,000 or $100,000, or something like that.

Mr. LAGUARDIA. You have not anything to sell but your training planes.

Mr. KEYS. No; but we can build anything. We have not received any orders and have not expected orders to be made for us, and I do not see any reason why they should. If the Army or the Navy wants airplanes, we want to build them. We do not want to build them if they do not.

Mr. LAGUARDIA. Mr. Keys, the Navy has an airplane factory.

Mr. KEYS. Yes; the Naval Aircraft Factory at Philadelphia.

Mr. LAGUARDIA. Have you ever been there?

Mr. KEYS. I have been there; yes.

Mr. LAGUARDIA. Do you think that that is a good idea or a bad idea?

Mr. KEYS. It is hardly a fair question. Of course, as an industrial man, I think it is absolutely unfair in an infant industry to establish a factory big enough to take care of the entire peace-time demand. If it were operated sensibly, on an industrial basis, and then expect the industry to stay alive and cooperate with the Government.

Mr. CALDWELL. But is there not a middle ground?

Mr. KEYS. Yes; there is a middle ground.

Mr. CALDWELL. By which we might own such a proposition and operate it on a percentage basis, and assume an attitude of live and let live.

Mr. KEYS. The live-and-let-live basis is what it ought to be. The Government ought not to be shut out from doing aeronautical work.

Mr. HULL. Is not this true, Mr. Keys, and by the question I do not want you to understand that I am prejudiced at all, one way or the other, that if the commercial side of the airplane develops, it will develop from the commercial side and not from any help that it receives from the Government.

Mr. KEYS. There is no doubt about that. Make it a subsidized industry and every dollar of capital would draw out of it. I would not leave a dollar of my money in. I do not know what I have in the Curtiss Co., probably a half million dollars.

Mr. HULL. If the airplane industry was to depend on Government orders, and if we are not going to have commercial aviation, we had better not try to build up the industry at all, had we?

Mr. KEYS. You had better not, because you will lose your money if you invest in the industry. I would not leave a dollar of money there myself.

Mr. LaGuardia. What would you do? would you stop building battleships because they do not bring a return?

Mr. Keys. You mean for the Government to stop building them?

Mr. LaGuardia. Yes.

Mr. Keys. Oh, no; I do not say the Government should only buy the things that it can make a return out of. I have not said that.

Mr. LaGuardia. You are creating that impression. You are creating the impression, Mr. Keys, that there is no outlook for commercial aviation; that there is no money in building aviation equipment; that the Government can not do it, and that it should not encourage or help aviation, and for that reason we should stop building aviation equipment. Are those the views you want to leave with the committee?

Mr. Keys. Not at all. When I say that the Government should not buy any aviation material from which it does not look for a direct return, it gets that direct return when it uses the material. It should not buy any material it is not going to use or does not want.

Mr. LaGuardia. You will admit that aviation is a part of the national defense to-day?

Mr. Keys. Yes; it is.

Mr. LaGuardia. And we can not get along without that any more than we can get along without a Navy.

Mr. Keys. No; you have got to have it.

Mr. LaGuardia. And what this committee is trying to do is to develop an industry in this country so we will have it and will not have to go through with what we went through with during the last emergency, and we want your advice, if you can give us any. Instead of that you come here and say, "Gentlemen, the thing is hopeless; do not do anything; we are going to liquidate and advise everybody else to liquidate."

Mr. Keys. No; I did not say that we were going to liquidate. I said that we had spent $1,000,000, or were going to spend $1,000,000, to keep going.

STATEMENT OF MR. F. G. DIFFIN, 52 VANDERBILT AVENUE, NEW YORK CITY.

Mr. LaGuardia. Mr. Diffin, what company are you connected with?

Mr. Diffin. The United Aircraft Engineering Corporation.

Mr. LaGuardia. Have you any factories?

Mr. Diffin. No, sir.

Mr. LaGuardia. It is just an engineering company?

Mr. Diffin. Yes, sir.

Mr. LaGuardia. How long have you been in aviation engineering?

Mr. Diffin. Since 1914.

Mr. LaGuardia. Mr. Diffin, do you believe the manufacture of airplanes would be simplified, improved, and reduced in cost if all the governmental activities in aeronautics were concentrated in a central department of aeronautics?

Mr. Diffin. Yes, sir.

Mr. LaGuardia. Will you give us your views on that, Mr. Diffin?

Mr. DIFFIN. I would like to go a little different from what the previous gentleman testified to in regard to that. If a separate department of aeronautics is created and given full authority and definite direction as to what they should accomplish, I think they will accomplish a great deal along that line. About 80 per cent of the airplane is industrial and technical rather than military or naval in its uses. Centralization of all specifications and concentration of all material necessary for the Government's use should be in the hands of one department which should have charge of all departments. This central authority, or department—call it what you will—should be created at once and should immediately take steps toward the enactment of laws governing the operation of aircraft in the United States. It is an unpardonable error that to-day we have not any such laws in process of formation. It will be the biggest deterrent factor in aviation that I know of if those laws are not very speedily put into effect.

As to operation of planes after they are built for the Government, to-day without a doubt the military and naval arms of the service should operate their own planes. With the development that is phophesied here and in Europe as to what the next war will be, which will be a war of the air and of chemicals, without a doubt, airplanes will be a separate offensive or defensive arm of the service and should be conducted by men competent, qualified, and trained, as a rule, in their manufacture, operation, and all the various points in between. That is an event of the future to be met with by such department having a knowledge of what foreign Governments are doing, what they are preparing to do, and what the possibilities are. To that end this department should have representatives all over the world where aeronautical development is going on so we are kept in absolute contact and touch with what the rest of the world is doing aeronautically.

This department, if created, should have its scope well defined and empowered and authorized and directed as to what it should accomplish, and not give direction to some one man to play with it as he might, because it would depend in that department as to what the personnel was at the head of it, as to what their vision was or what has vision was or what he conceived was necessary; and I think that that department should be created, as I have stated, with definite objects, definite commitments, and told what they should accomplish and how it should be done.

Mr. LAGUARDIA. Along those lines, Mr. Diffin, do you not think that the creation of a national academy of aeronautics would be very useful?

Mr. DIFFIN. Undoubtedly.

Mr. LAGUARDIA. And also a chain of landing fields all through the country.

Mr. DIFFIN. A chain of landing fields would be the first fundamental thing that this department should undertake.

Mr. LAGUARDIA. With signal systems and a testing department.

Mr. DIFFIN. Yes, sir; and a meteorological service.

Mr. LAGUARDIA. Do you not think it would be well to have experimental fields where inventors might bring their planes and find motors, or might bring their motors and find planes for the purpose of development?

Mr. DIFFIN. No; I do not quite see it in that way. I made the suggestion before the Senate committee that if such a department were authorized that a series of prizes should be offered, covering a specific number of years of sufficient amount to attract the individual or the corporation to design planes or motors; that it should be subject to certain specifications; and that certain entrants would be allowed, cutting out the cranks or the people who would bring a million and one devices in. They should be reimbursed, possibly, for their actual expense, and the prizes should be substantial enough to encourage men in plane designing and motor designing, and when that design is accepted, the development and perfection of the individual motor should be done at Government expense.

That should be done for each current year, and the Government should have these designs, whether one, five, or ten designs of planes or motors be adopted, the Government should make a complete set of tools, gigs, or fixtures, so many as might be necessary during the current year, so that a plant may be diverted to the manufacture of military aircraft and may go almost immediately into production of those machines. I think that would be one of the cheapest forms of insurance which the Government could have, and it would give it during any current year complete sets of tools for the making of machines of sufficient types and give it the advantage of the latest development in planes for military or naval use. And that would only be accomplished under one definite head of the Air Service.

Mr. LAGUARDIA. Could not the carrying of mail by airplane be extended a great deal over the Western and Middle Western parts of the United States so that the men could be kept in constant flying condition, and also provide for the development and building of planes?

Mr. DIFFIN. Well, right now it could not be economically handled, but it could be extended.

Mr. LAGUARDIA. That service has not been developed to its fullest extent?

Mr. DIFFIN. No. I am a very firm believer in the development of a mail service by airplane.

Mr. LAGUARDIA. Especially where we have not railroad facilities?

Mr. DIFFIN. That can only be done by the establishment of sufficient landing fields properly located and properly operated.

Mr. LAGUARDIA. Have you any other suggestions to make?

Mr. DIFFIN. No; except that the quicker a separate air service is established, the better the defense of the United States will be, and the better it will be for the commercial development of the industry.

Mr. LAGUARDIA. The commercial future of aviation is not so doubtful, is it?

Mr. DIFFIN. I do not think so, if it has the proper encouragement and development.

Mr. LAGUARDIA. England has developed it more than we have?

Mr. DIFFIN. England has some 40 or 50 well-established landing fields within her dominions.

Mr. LAGUARDIA. And has established some passenger-carrying lines?

Mr. DIFFIN. I do not know about that.

Mr. LAGUARDIA. They have a daily service across the Channel now?

Mr. DIFFIN. They have now two lines.

Mr. OLNEY. Government plants would be used, according to your testimony, in the manufacture of jigs, dies, tools, etc.?

Mr. DIFFIN. And all that enters into that at the Government plant, and that can be done by economical operation.

Mr. OLNEY. So, the Government plant could be used in that way?

Mr. DIFFIN. It would keep the Government plant busy. And that is not new. It is simply a repetition of the same policy which was in existence prior to the war in relation to rifles. The idea was that a complete set of dies could be given to one of these factories and they could go ahead and manufacture the rifles.

Mr. HULL. That policy was adopted by Congress and an appropriation was made for that purpose, but it was never carried into effect by the Army.

Mr. DIFFIN. I know that was what was intended, but I believe it was never done.

Mr. HULL. Have you read the bills pending before Congress on this subject?

Mr. DIFFIN. You mean the aeronautic bills?

Mr. HULL. Yes.

Mr. DIFFIN. I have read a number of them; yes. I do not know which specific one you refer to.

Mr. HULL. Have you read the New bill?

Mr. DIFFIN. Yes.

Mr. HULL. Does that bill incorporate your ideas?

Mr. DIFFIN. The New bill I read was the one which was introduced some time ago, and I read it a few months ago.

Mr. HULL. Did the one you read incorporate your idea?

Mr. DIFFIN. It was not complete enough.

Mr. HULL. In what way?

Mr. DIFFIN. I could not answer that without going into a definite analysis of the bill. I prepared an analysis of it some time ago, which I sent to Senator New.

Mr. HULL. That bill created a department of aeronautics with the head of it a member of the Cabinet?

Mr. DIFFIN. Yes, sir.

Mr. HULL. Do you favor that?

Mr. DIFFIN. I would not state unqualifiedly that I am. There ought to be a head of the Air Service with proper authority—a responsible head.

Mr. HULL. That took out the personnel?

Mr. DIFFIN. Yes, sir; and it should.

Mr. HULL. It should? I thought you expressed the sentiment that it should not.

Mr. DIFFIN. Only as to the military operation end of it. I do not conceive that in the entire personnel required in the operation of planes that every man is a finished flier. I do not know just exactly what the percentage would be, but possibly 3 or 4 per cent should be finished fliers. Those men should be trained in this aeronautical academy which has been proposed and then turned over to the Army or to the Navy for their special training in the work they are to do in those services.

Mr. HULL. Did you ever realize how complicated that would be if you had a part of the aviation personnel under one control and another part of it under another control?

Mr. DIFFIN. That is not my idea, but I do say I do not see why, if an artillery officer can be put in charge of some other branch why aviation can not be removed to some other department.

Mr. HULL. You say 4 or 5 per cent ought to be put in charge of aviation and the rest of them would be under the Army. Part of your force all the while would be graduated from one to the other.

Mr. DIFFIN. In connection with the operation of the planes at the front, back of that lies a tremendous personnel which should be under the direct charge of the department of air. The lubrication engineers, the mechanics, experienced men—I am speaking of mechanical men who are schooled in the operation of motors and their repairs, which is a distinct business and branch of service in itself, and in no way to be confounded with the infantry or other branches.

Mr. HULL. And you would put it under one head, a commanding general?

Mr. DIFFIN. He should be the commanding general of the air department.

Mr. HULL. A part of the orders of the general in command?

Mr. DIFFIN. Certainly, judging by our experience of the last four years.

Mr. HULL. Do you know any country which has tried that?

Mr. DIFFIN. A separate air service?

Mr. HULL. That operates its air service as a separate command?

Mr. DIFFIN. I think we are talking at cross-purposes. I mean we should have a separate air service.

Mr. HULL. You said it should be outside of the military command, if I understood you correctly. That is the point where we all get into very deep water.

Mr. LAGUARDIA. I think the witness said we should have a separate air service except up to the time of entering into operations with the Army at the front, and then that those who operate with the Army at the front ought to be under the command of the Army.

Mr. DIFFIN. There is no question about that.

Mr. LAGUARDIA. All the rest, in the rear, the supplies, the mechanics, etc., should be under the air force.

Mr. HULL. Then you would have a separate supply system?

Mr. LAGUARDIA. Did we not have it in this war?

Mr. HULL. It was under the command of the General Staff.

Mr. LAGUARDIA. Nominally.

Mr. HULL. There was not anything that could be done in France except through the General Staff. The General Staff had control of everything.

Mr. LAGUARDIA. Not of supplies; we ran that ourselves.

Mr. HULL. But under the General Staff.

Mr. LAGUARDIA. Yes.

Mr. DIFFIN. As to how the planes should be operated in action, I am not qualified to answer that, but I think, in so far as the development of planes for the purpose of national defense or the development of aviation, that should be under a separate head.

Mr. HULL. So many people can tell what ought to be done, but when you come to the actual framing of a bill that will carry that into effect it is a different proposition.

Mr. DIFFIN. I agree to that.

Mr. HULL. The military business is a peculiar thing, and when you come to try to frame a bill I find it is mighty easy to say what is to be done, and everybody tells us what ought to be done, but when you come to frame a bill it is an entirely different proposition. So many newspaper men and so many other civilians can tell us what ought to be done, but there is not one of them who could begin to frame a bill within six months.

Mr. LAGUARDIA. The General Staff has made suggestions.

Mr. HULL. The General Staff has made suggestions, but they can not frame a bill.

Mr. DIFFIN. Outside of the matter of the phraseology of the bill, I think there are a great many men who have a full and complete knowledge of aircraft who could give you the essential points that should be covered in the creation of a separate air service, leaving it to men properly qualified to put it into proper phraseology.

Mr. HULL. But they do not agree at all on the points that should be covered.

Mr. DIFFIN. Have they been asked specifically?

Mr. HULL. Yes.

Mr. DIFFIN. The subject of aeronautics is so huge that there is not any man who knows anything about it who could not talk on it for a year and not repeat himself.

Mr. HULL. The point we are trying to get at is how to be prepared for the next emergency. My thought has been, and I rather thought you agreed with me, but I do not know whether you do or not, since I have asked you a few questions. You seem to go a good deal further than I thought you did. My thought has been, and I have framed a bill along that line—although I am not satisfied with the bill I have framed—my thought has been that all we can do at the present time is simply to create a department of aeronautics.

Mr. DIFFIN. Yes, sir.

Mr. HULL. With a big man at the head of it.

Mr. DIFFIN. Yes, sir.

Mr. HULL. With a sufficient number of competent assistants.

Mr. DIFFIN. Yes, sir.

Mr. HULL. And he should investigate, giving him plenty of authority, practically all authority, in cooperation with the Army and Navy.

Mr. DIFFIN. I think there you are putting a limiting factor on it. If he has to cooperate with the Army and Navy his functions may be very much limited.

Mr. HULL. He has to do that because he is going to have men from the Army and the Navy in there. There is nobody who does not believe that you have got to have cooperation, and harmonious cooperation, and coordination.

Mr. DIFFIN. That is right.

Mr. HULL. If you do not have that you had better scrap it right now.

Mr. DIFFIN. If you limit him to definite cooperation with the Army and the Navy you might limit him too stringently.

Mr. HULL. We limit it by saying there must be cooperation by putting in as his assistants men who come from the Army and from the Navy, and they ought to have harmonious cooperation. That department can figure this thing out much beter than you or I or anybody else.

Mr. DIFFIN. Yes.

Mr. HULL. If you give the chief of that department the authority and put in a big enough man at the head he will figure the thing out. That is my idea. But if you do, are you going to take over the personnel?

Mr. DIFFIN. That might be necessary; the man with the authority might figure that it might be the right thing to do.

Mr. HULL. You let him decide that?

Mr. DIFFIN. Yes.

Mr. HULL. And not let us try to decide it, because we are the nontechnical branch, and we can not take the time. The subject is so big that I think anybody who would try to do that thing would have to study it for at least three months, and perhaps longer.

Mr. DIFFIN. There is no question about it.

Mr. HULL. I rather think that is the best suggestion we have had. But there are so many people coming before us who say that such a department should operate. Some of them even advocate a separate general staff for that department.

Mr. DIFFIN. That might be in 5 years or 10 years hence. But the thing you are to deal with is the actual conditon as it is to-day. The separate air service is a necessary.

Mr. HULL. I think nearly everybody is agreed that it should include research, engineering, and production, and if you create a department that goes that far you have practically done all that Congress can do. Congress can not go into the details.

Mr. DIFFIN. No.

Mr. OLNEY. This department must be an active organization and not an investigating organization.

Mr. HULL. It would simply be an acting organization or department.

I wanted to ask you whether I understood you correctly that you believe the future of the airplane in commercial business has a good prospective success?

Mr. DIFFIN. I do.

Mr. HULL. In what way?

Mr. DIFFIN. If properly developed. It is not a rank weed that will grow itself; it has to be developed by the people in it. But I believe there is a distinct future for aircraft commercially.

Mr. HULL. If it is a commercial proposition, will not the commercial men find it out?

Mr. DIFFIN. But there is not to-day one bank out of a hundred that will loan a dollar on aircraft securities. I have had it expressed within the past two weeks by some representative banks that the Government does not seem to think much about aircraft, and it is not for us to make any determination upon it. They only judge from what little they see in the papers.

Mr. HULL. The reason the banks do not want to loan on aircraft securities is this fact, is it not, that at the present time there is very

little prospective commercial development? We might as well face the facts of the situation.

Mr. DIFFIN. I say there is a prospective commercial development, given capital to carry it on.

Mr. HULL. Is there any prospect that capital will seek it?

Mr. DIFFIN. They have to be shown. But in my opinion there are unlimited possibilities. Take the matter of the interchange of securities between New York and Chicago. As it is now that means two days' interest, and the saving to the Continental Commercial Bank of Chicago, if they could transport their securities overnight, would be $80,000 a year. That is only one item of one bank in Chicago.

Mr. HULL. But we are speaking of the real commercial development.

Mr. DIFFIN. That is commercial development; if the lines are put in and the service afforded the banks will utilize it, but it will take $12,000,000 to put a line in.

Mr. LAGUARDIA. It would not take that much if we had the fields?

Mr. DIFFIN. That is including the landing fields and the whole operation of it, to maintain an overnight service between New York and Chicago.

Mr. HULL. The automobile never had any particular encouragement, but developed itself.

Mr. DIFFIN. I am not asking for the Government to encourage commercial aviation, but I am asking for the Government to develop its own aviation, and if that is done commercial aviation will be developed. If you have one central head, commercial aviation could come to the Government and get valuable data in regard to engines and planes, and you could get much better and more practical results out of one central organization than you could out of a dozen different organizations. There is commercial development, but it is in degree, and no one can tell what that degree will be.

STATEMENT OF ADMIRAL ROBERT E. COONTZ, CHIEF OF NAVAL OPERATIONS, UNITED STATES NAVY.

Mr. LAGUARDIA. Admiral, this committee is now studying the question of a separate or united air service, and we wanted to get your views, frankly, on that subject. We want to know, first, just how naval aviation is controlled in your department at this time.

Admiral COONTZ. Naval aviation at present is controlled by the Director of Aviation, who is a subordinate in the Office of Naval Operations, with four or five assistants.

Mr. LAGUARDIA. Is the question of materials and supplies all under his jurisdiction or is that divided into different bureaus of your department?

Admiral COONTZ. Materials and supplies are under the cognizance of the different bureaus. Until recently aviation materials were handled through the material section of aviation in the Division of Operations. Now, these are handled through the material section of operations. The aviation material section has been discontinued.

Mr. LAGUARDIA. Is that working out satisfactorily?

Admiral COONTZ. It is just at present, as far as I can see. I have only been here one month and I have been carefully watching the situation to see just how it is going to work, but as it stands now aviation is working smoothly as regards matériel, and we are carefully considering the personnel end, as we have about 4,000 officers and 20,000 men in the reserve. We are considering the reserve question very carefully.

Mr. LAGUARDIA. We understand you have made arrangements with the Army to train some of your flyers; is that working out satisfactorily?

Admiral COONTZ. That is only in the incipient stage. We have a joint Army and Navy committee, just as we have a big joint Army and Navy Board, and for the first time we are endeavoring to get together on all points and work out things together from war plans down. I think it is going to work out satisfactorily.

Mr. LAGUARDIA. Besides your naval aviation, you also have your Marine Corps aviation; is that correct?

Admiral COONTZ. That is correct.

Mr. LAGUARDIA. That is not under your jurisdiction, is it?

Admiral COONTZ. That is under the jurisdiction of the Commandant of the Marine Corps, under the direct action of the Secretary of the Navy. If we wanted certain ones for certain work, the Chief of Naval Operations would call on the Commandant of the Marine Corps and would get them just the same as he would marines for certain duties.

Mr. LAGUARDIA. And he gets his supplies and equipment from your appropriation, does he not?

Admiral COONTZ. No, sir.

Mr. LAGUARDIA. Has he a separate aviation appropriation?

Admiral COONTZ. He has, I think, a separate avaiation appropriation.

Admiral TAYLOR. No; it is all one appropriation.

Mr. LAGUARDIA. And that is your appropriation?

Admiral COONTZ. Yes.

Mr. LAGUARDIA. If you found that pilots could be trained more efficiently and more economically, from a national point, and not as a matter of departmental pride, the Navy Department would not object to a central department for the purpose of training the men, would it?

Admiral COONTZ. Yes.

Mr. LAGUARDIA. It would object, regardless of the fact that they could be trained as efficiently and more economically?

Admiral COONTZ. It would. Of course, I might qualify that a little. To start with, of course, I would not believe they could be trained as economically, nor do I believe they could be trained as efficiently for naval work; and, of course, there are many side questions, such as whether they would enter the Navy permanently and the question of retirement and matters of that character, so that, just offhand, I should not think they would favor it.

Mr. LAGUARDIA. That makes your stand very clear, but assuming that they could be trained efficiently and more economically, would you still object to such a system?

Admiral COONTZ. If they could; yes.

Mr. LaGuardia. You would object?

Admiral Coontz. No; if you could prove your case.

Mr. LaGuardia. Now, then, as to the question of supplies, you know, of course, that supplies, maintenance, repairs and materials constitute about 90 per cent of aviation?

Admiral Coontz. I have never figured it out, but I suppose it is very large.

Mr. LaGuardia. It is the greater part of aviation. If that could be conducted by a united air service more efficiently and more economically, would you object to that being united?

Admiral Coontz. No.

Mr. LaGuardia. Do you believe it can be?

Admiral Coontz. No.

Mr. LaGuardia. Is that judging from experience?

Admiral Coontz. Just from general naval experience. I may be wrong.

Mr. LaGuardia. Of course, you do not believe that both services should overlap each other in doing the same thing when one of them could do it?

Admiral Coontz. No.

Mr. LaGuardia. And you believe, of course, that the Navy should have control of all dirigibles, do you not?

Admiral Coontz. Well, in general, yes. I think the Navy should have control of all that it needs in training and in warfare.

Mr. LaGuardia. Have you come to an understanding with the Army on the question of dirigibles?

Admiral Coontz. I believe that that question is still under consideration.

Mr. LaGuardia. And has been for some time.

Admiral Coontz. But I believe they are just about to come to an agreement.

Mr. LaGuardia. Have you come to an agreement on the question of the development of gas?

Admiral Coontz. I believe they are getting toward an agreement on that within the last couple of weeks. I have not noticed a late report. We have a joint board on helium gas, one representative of each department, and they are working together.

Mr. LaGuardia. Of course, you know that there were requests for appropriations by the Army and by the Navy for the development of helium gas.

Now, Admiral, assuming that a separate air department was created, how much of the work of aviation do you believe should be controlled by the Navy for the successful operation of your work?

Admiral Coontz. I will be honest with you; I do not see how it would work out. I do not believe it could be done.

Mr. LaGuardia. You are not prejudiced in any way?

Admiral Coontz. No; but I say I do not believe it could be worked out, so far as the Navy end is concerned.

Mr. LaGuardia. You are familiar with the very fine work carried on by your aviation in the war, are you not?

Admiral Coontz. To some extent.

Mr. LaGuardia. Will you tell me just what they did that was peculiarly naval aviation?

Admiral COONTZ. Well, I suppose, such work as they did at sea, in the line of radio work, bombing, and such matter. You must understand that I am not very much up on the aviation subject. I have only taken it up largely within the last month, and I am only thinking as regards the sea part and the sea end of it. The naval aviation in which we participated in this war was but a single and, perhaps, unimportant phase—that is, the scouting for and protection from submarines. Nothing was developed along the lines of fleet aviation or naval aviation as we hope to establish it.

Mr. LAGUARDIA. That is what we want. For instance, the greatest part of naval aviation on the other side was the formation and getting ready for what was known as the northern bombing project.

Commander CALLAN. No; that was not the largest part of naval aviation. That operation was a rather small operation that we had.

Mr. LAGUARDIA. Do you know how many planes and men were involved in the northern bombing project?

Admiral COONTZ. No, sir; not without looking at the data.

Mr. LAGUARDIA. Now, Admiral, let us get right down to this point: Assuming that a separate air service is created, can such a separate air service depend upon the cooperation of the Navy after it comes into existence?

Admiral COONTZ. Yes.

Mr. LAGUARDIA. Now, then, as to the northern bombing project, how many men were assigned to that?

Admiral COONTZ. Two thousand one hundred and fifty-four; 294 officers and but 35 aircraft.

Mr. LAGUARDIA. What other operations did naval aviation conduct overseas?

Admiral COONTZ. In France we had stations at Brest, Fromentine, Arachon, L'Abor Vrach, Le Tudy, Le Croisic, St. Trojan, Trequier, Dunkirk, Paimboeuf, Guiavas, Guyan, La Trinito, La Pallice, Paullac, and Moutchic. I present herewith a table giving United States naval aviation situation on November 11, 1918:

Table giving the United States naval aviation situation on Nov. 11, 1918.

Station.	Operations commenced.	Aircraft Nov. 11, 1918.	Number of flights.	Sea miles patrolled.	Number of officers.	Number of men.
FRENCH.						
Brest (seaplane)	Aug. 1, 1918	30 seaplanes	211	7,355	53	786
Fromentine	Aug. 9, 1918	14 seaplanes	335	38,009	31	372
Arcachon	Oct. 1, 1918	7 seaplanes	106	8,727	26	312
L'Aber Vrach	July 23, 1918	19 seaplanes	355	29,302	41	477
Ile Tudy	Mar. 7, 1917	21 seaplanes	1,238	104,877	22	363
Le Croisic	Nov. 18, 1917	17 seaplanes	1,045	113,324	22	337
St. Trojan	July 3, 1918	11 seaplanes	246	19,533	26	343
Treguier	Sept. 30, 1918	8 seaplanes	30	1,380	16	266
Dunkirk	Mar. 18, 1918	12 seaplanes	491	45,630	7	205
Paimboeuf	Mar. 5, 1918	3 dirigibles	257	48,630	30	478
Guipavas	(1)	1 dirigible			15	396
Gujan	(1)				10	240
Brest (k. b.)	(2)	22 kite balloons			18	59
La Trinite	(2)	4 kite balloons			5	150
La Pallice	(2)	do			9	216
Paullac (repair base)	[2] July 2, 1918	84 seaplanes	[3] 372	[3] 15,085	121	3,168
Moutchic (school)	Nov. 11, 1917	24	[4] 10,807	[4] 242,320	57	493

[1] No operations. [2] Test flights only. [3] Test. [4] Training.

Table giving the United States naval aviation situation on Nov. 11, 1918—Contd.

Station.	Operations commenced.	Aircraft Nov. 11, 1918.	Number of flights.	Sea miles patrolled	Number of officers.	Number of men.
IRISH.						
Queenstown	Sept. 30, 1918	28 seaplanes	64	11,568	72	1,426
Lough Foyle	Sept. 3, 1918	7 seaplanes	41	6,000	20	432
Wexford	Sept. 18, 1918	5 seaplanes	98	19,135	22	405
Whiddy Island	Sept. 25, 1918	3 seaplanes	25	3,870	18	400
Castletownbere	May 21, 1918	16 kite balloons	(1)	.....	12	91
ITALIAN.						4
Porto Corsini	July 25, 1918	17 seaplanes	745	.....	27	360
Lake Bolsena	Feb. 20, 1918	8 seaplanes	5,540	.....	11	69
ENGLISH.						
Killingholme	Feb. 19, 1918	46 seaplanes	404	.....	91	1,324
Eastleigh	Sept. 24, 1918	41 seaplanes	(1)	.....	70	1,928
Northern bombing group	July 20, 1918	35 landplanes	(2)	.....	294	2,154
Total	.....	.....	.....	.....	1,159	17,391

[1] Test flights only. [2] No patrol flights.

Eleven men and 8 officers have been reported as casualties, while 2 officers were taken prisoners of war.

		Miles.
War flights	5,691	549,078
Training flights	16,347	242,320
Total flights	22,038	791,398

Mr. LaGuardia. Pauillac was a receiving station?

Admiral Coontz. Yes.

Mr. LaGuardia. Excluding Pauillac, how many planes did you have assigned to the stations you read off?

Admiral Coontz. Two hundred and forty-five heavier-than-air craft, 4 dirigibles, and 30 other machines.

Mr. LaGuardia. How many men?

Admiral Coontz. Nine thousand five hundred and seventy-eight men and 501 officers.

Mr. LaGuardia. How did that compare with the northern bombing project?

Admiral Coontz. Approximately eight times as large.

Mr. LaGuardia. That work was coastal work, was it not; Coast Guard work?

Admiral Coontz. All of it was coastal work, with the exception of one bombing group.

Mr. LaGuardia. You worked under the command of the French?

Admiral Coontz. No; that was strictly United States.

Mr. LaGuardia. You would consider that a naval operation?

Admiral Coontz. In the past.

Mr. LaGuardia. How would you consider that in the future?

Admiral Coontz. When we get to talking about what is going to be in the future I could not tell you.

Mr. LaGuardia. Please explain to the gentlemen of the committee what the sea work was.

Admiral Coontz. The sea work was convoying and submarine work and bombing.

Mr. LaGuardia. Did they use seaplanes or land planes?

Admiral Coontz. Both. I would like to qualify that statement in this way. In the convoy and submarine search work the seaplane

was used. In the bombing operations there were probably some land planes.

Mr. LaGuardia. That was flying over water, was it not, Admiral?

Admiral Coontz. Yes, sir.

Mr. LaGuardia. Was this flying any different than that done by the Army fliers over land?

Admiral Coontz. So far as the actual flying was concerned, probably not. But the problems concerned were strictly naval problems and not Army problems.

Mr. LaGuardia. It consisted in detecting a ship on the water instead of an ammunition dump on the land?

Admiral Coontz. I would hardly say that. It consisted also of the navigational problems without land marks, and by the use of naval instruments.

Mr. LaGuardia. A flier flying at night navigates the land by instruments.

Admiral Coontz. Not the same as he navigates the sea.

Mr. LaGuardia. Now, Admiral, a good many of your men overseas, especially in the northern bombing project, were trained in Army schools, were they not?

Admiral Coontz. I do not know about that—about twenty Marine Corps pilots were partially trained in advance flying by the Army.

Mr. LaGuardia. Do you care to make any further statement in reference to this matter? We want to get your views fully.

Admiral Coontz. You mean on the particular question of the combined Air Service?

Mr. LaGuardia. Yes, sir.

Admiral Coontz. I will tell you I look on the Air Service as one of our greatest problems, one that we should approach with the greatest care, and be extremely careful about. I look for the time to come when on each man's house he will have a little platform, and he will come up and get in his machine and ride down to a department store, get out and go down and buy his goods and come up and go on somewhere else. I think that in time airplanes will be as common as automobiles, practically. I look on the civil part of it as being entirely separate from that part of it pertaining to the Army and Navy. It seems to me that the Army and Navy end of it must and will be separate from the civil end.

It seems to me that up to a certain point we might train the men together, but that we must have specialized work in the Navy as well as in the Army. The idea in the Navy is that the aviation people are part of the Navy just as every officer is. Up to a certain age the man in aviation is detailed as an aviator; that age may be 35. Then, in the Navy just the same as in the Army, in course of time they go on the retired list, and they get their 50 per cent extra pay, and if after 35 years of age they are not any good as aviators, they are liable to be a drain on the Government. We expect, with the reserves, to be able to have sufficient officers and men to call back each year and train just as we do the seamen and all the rest.

We expect with the money you give us to experiment and find out what is best, so that when the next war comes all we have got to do is to expand. We believe if we had this Air Department, with its

head as a member of the Cabinet, it would carry with it so much additional expense it would not be practicable. We do not believe a man can be taken suddenly and thrown, as we will have to do, on shipboard, and be as efficient as if he had had the other training. If a man has the sea and the Navy methods we believe he would be a better aviator than somebody who might be trained in Illinois, or some other part of the country.

I have not studied the subject deeply.

Mr. LaGuardia. There is no doubt in your mind that the Navy Department should be a separate department, is there?

Admiral Coontz. No.

Mr. LaGuardia. Of course, you are familiar with the history of the Navy Department?

Admiral Coontz. I think I am.

Mr. LaGuardia. You recall when in the early days of our country the Navy was under the War Department?

Admiral Coontz. I do.

Mr. LaGuardia. You will find very interesting reading if you will look up the debates that occurred at the time the Navy was made a separate department. There was a committee formed very much like our Aircraft Advisory Board that undertook to build a Navy, and they did very much the same as that board, they spent a lot of lump sum appropriations and did not have the ships completed. From that grew the present Navy Department as a separate department. The very objections that are now being raised against a separate air department, making it a coequal branch of the Government were then raised against the creation of the Navy Department as a separate department.

As you say, you see a future for aviation and some of us feel that we ought to start now to give this country a chance to develop the aviation industry. What we are trying to get now is not the viewpoint of a naval officer, but your viewpoint as an American citizen. We feel that if we have a separate service, we can get some of the very fine material from the Navy for aviation, and we want the support and cooperation of your department.

Admiral Coontz. If you create a separate department you will receive the full cooperation of the Navy Department. I am, of course, giving you my views as an American citizen and as a naval officer. If we are going to have air machines as common as automobiles everybody in time will be an aviator and we will have no trouble in picking them up. They are increasing in numbers in civil life right along.

Mr. LaGuardia. Since the armistice this country has not kept abreast of England and France in the development of aviation?

Admiral Coontz. No; but we are hoping when we get the next appropriation to go along quite rapidly along experimental lines.

Mr. LaGuardia. But you need dirigibles, and we have bought one from England and one you are building will be a copy of a German model?

Admiral Coontz. Of course, in a number of those things we are behind, and when the war comes we spend our money that way and we have to get what we can.

Mr. Olney. You would not reasonably object to a central controlling authority when it would not interfere necessarily with the

different functions of the Army and the Navy and the other branches of the Government using airplanes? You could not reasonably object to a central authority which would procure machines for this service and would be acting in an advisory capacity as much as anything else?

Admiral COONTZ. I would not object if I thought it was for the best interests of the country and could be carried out.

Mr. OLNEY. After all, in time of peace we have to train men to fly commercially, we have to train men for the Post Office Department Service, or for your department or for any other department to prepare for war, and it seems to me it would not interfere with any functioning of your department, but would help its functioning to have one central controlling department.

Admiral COONTZ. Of course, I believe the Navy part, when we get to the grand finale in aviation, is going to be very small, numerically, so it would almost be negligible when compared with all we are going to have. I think our part would be so small as to be almost negligible, and I believe we could better handle it along our own lines.

Mr. LAGUARDIA. And production, too?

Admiral COONTZ. Well, production, possibly, is another matter. When we get so we can get everything we want quickly that production would be the smaller part of it.

Mr. HULL. What do you think of Lord Fisher's statement in regard to the destruction of a navy by airplanes?

Admiral COONTZ. I believe that every implement of destruction that is produced has one to defend against it, and as they come along with those things we will find something to kill them off.

Mr. HULL. Within the Navy?

Admiral COONTZ. Within the Navy.

Mr. HULL. As I understand your view, you do not object particularly to a central control, as far as research work, engineering, and the acquirement of material is concerned, a central control which, if it wanted to, could turn it over to the Navy or keep it within itself, simply coordinating and harmonizing the different branches of the Government?

Admiral COONTZ. No, sir; I believe strongly in combination research work, and I believe we are working to that end now. So far as the training of the personnel is concerned, I believe in the Navy holding on to that, as I believe we can function successfully along those lines for sea work.

Mr. HULL. I am a little inclined to agree with you at the present time, but I have not made up my mind about it. I can not now see how you are going to handle the personnel separately, but I do believe if we had some branch of the Government which legally would do practically what you are trying to do now, not illegally, but simply by common consent, I think the people of the country would be better satisfied, giving this branch of the Government enough authority so that if it found it advisable in connection with the Army and the Navy to extend this authority it could be done. I think that is really the only solution for us.

It is a tremendous problem, as you say, and we have to go at it rather cautiously and not destroy the good we have now in trying to reach out for something else.

Admiral COONTZ. I look on this matter as its being about equal in importance to the merchant marine question. I think they are the two big questions we have before us now.

Mr. HULL. There is no exact analysis with the Air Service. Do you see anything in the line of our past experience that exactly compares with it?

Admiral COONTZ. Hardly, because it has developed so fast. I believe in time it is going to be so universal that it will be every day and all the time with us.

Mr. HULL. Some people have thought that if we organized it along the lines of the Marine Corps that might do. The Marine Corps is absolutely under the Navy.

Admiral COONTZ. Absolutely.

Mr. HULL. There is no question about that.

Admiral COONTZ. None whatever. It is a part and parcel of the Navy.

Mr. HULL. It is auxiliary to the Navy?

Admiral COONTZ. Yes, and very useful in its line.

Mr. HULL. I am referring to its use as a fighting unit. It is an auxiliary service, just the same as the airplane is to-day?

Admiral COONTZ. Yes; along those same lines.

Mr. HULL. It is not a separate service.

Admiral COONTZ. No; we consider the airplane service a part of us.

Mr. HULL. The marines have nothing to do with the Army except when they are detailed?

Admiral COONTZ. That is all, unless they did as they did in France, where they were sent into the firing line.

Mr. HULL. When they were sent to fight with the Army it was done with the consent of the Navy?

Admiral COONTZ. Yes; and they are now all back again in the Navy.

Mr. MORIN. Does the Navy operate its own production plants?

Admiral COONTZ. The Navy has an aircraft factory in Philadelphia.

Mr. MORIN. Is that the only one you have?

Admiral COONTZ. That is the only one now in operation.

Mr. MORIN. Is that an important plant?

Admiral COONTZ. Yes, sir; we consider it a very important plant.

Mr. MORIN. Does it rate high in production?

Admiral COONTZ. Admiral Taylor can tell you all about that. I have only been here a month.

Mr. MORIN. I thought the Navy had a number of plants.

Admiral COONTZ. We had a number of stations, but we are demobilizing now, and have only a very few.

Mr. MORIN. You are going to maintain that plant permanently?

Admiral COONTZ. Yes, sir.

STATEMENT OF REAR ADMIRAL D. W. TAYLOR, CHIEF OF THE BUREAU OF CONSTRUCTION AND REPAIR, NAVY DEPARTMENT.

Mr. LAGUARDIA. Admiral, what are your duties in the Navy Department?

Admiral TAYLOR. Chief constructor, United States Navy, and Chief of the Bureau of Construction and Repair.

Mr. LaGuardia. Have you anything you desire to say to supplement the statement made by Admiral Coontz?

Admiral Taylor. I should like to say that I think Admiral Coontz is a little in error in regard to organization. There has been no change since he came to the department and the change made before he came to the department was entirely in Operations. The duties of the Bureau of Construction and Repair are now exactly what they were during the war, and the same is true as regards the other technical bureaus as regards aviation. The changes were substantially changes in the internal organization of Operations as regards aviation. We are operating now exactly as we operated during the war, and the general organization, the general method of handling aviation, is what was adopted about July, 1915.

The Navy Department had had various ideas of handling aviation and in July, 1915, the Secretary of the Navy took it up with his council, at a council meeting, and we went into the matter very carefully and agreed to handle aviation in the Navy just as we handled the rest of the work of the Navy, and it is being handled that way to-day.

Mr. LaGuardia. It is working satisfactorily?

Admiral Taylor. I think that perhaps is for other people to say. We are believers in a functional organization and the Navy is organized along functional lines and does all its work along those lines.

Mr. LaGuardia. So that there is not any one bureau in the Navy that has complete charge of material and supplies for aviation?

Admiral Taylor. Not any more than it has complete charge of material or supplies for a battleship or a destroyer, or any other naval activity. We have one bureau which does the purchasing, and we have had one bureau which has done the purchasing of the supplies for the Navy for about 30 years.

In the same way we have one bureau which handles steam engineering, one bureau which handles ordnance, and so on. The Bureau of Ordnance handles ordnance for airplanes, just as it handles ordnance for battleships. That does not mean necessarily that the same people do it for both. Each bureau has a section for its particular work in connection with airplanes. In the Bureau of Construction and Repair at one time during the war the aviation section comprised 150 people, which was more than the whole bureau had before we went into the war.

Mr. LaGuardia. Admiral, do you believe the present system of a divided Air Service for the Post Office Department, the Army, Navy, and other departments, having them come in and asking for appropriations for aviation—do you think that can be carried on as economically and efficiently as if we had a united service which would have charge practically of all aviation matters?

Admiral Taylor. I would hesitate to speak for the Army or for the Post Office Department, although I think the Post Office Department is operating its service much more cheaply than it is being done anywhere else in the world to-day. As regards Navy aviation, I am quite satisfied that the cost for a given amount of aviation would be much cheaper than it would be under any separate air department.

Mr. LaGuardia. So you do not believe it would be economical to the Government to unite all these aerial activities under one department?

Admiral Taylor. I would not say that. I say I do not believe it would be economical for the Navy, considering the amount of aviation that the Navy requires. I believe it will be more economical to handle it as it has been handled in the past.

Mr. LaGuardia. Assuming that we found it more economical, and that a separate Air Service should be created, could the Navy obtain the aviation equipment it needs for its operation from such other departments easily?

Admiral Taylor. I am a very poor prophet, but I do not believe it could.

Mr. LaGuardia. Will you tell us why?

Admiral Taylor. Simply for the reason that the Navy is thoroughly cognizant at any given time of what it needs in the way of maintenance and equipment. The Navy is essentially a mechanical service. The bureaus of the Navy are organized and operated to supply the Navy what they need, and the line officers control absolutely, in the last analysis, what they have to buy, their weapons, as they must. They are the customers and the technical people are always the producers. If you had to deal at arm's length and separately with people instead of dealing directly, the result would be a great loss of efficiency and great additional expense.

Mr. LaGuardia. Let us reverse the proposition. Could the Navy undertake the control of all aviation in order to provide the other departments what they need in the matter of production and take over all personnel for fighting aviation?

Admiral Taylor. Not to advantage; no, sir. The Army and the Navy, when we went into the war, had a distinct agreement as to the field of each, and they worked each within its own field. Sometimes there has been overlapping, but it is due to the fact that the Navy knew exactly what it wanted to do and restricted itself primarily to its own functions that it was able to accomplish anything.

Mr. LaGuardia. Has the American Navy kept abreast in aviation development with the navy in England?

Admiral Taylor. As regards naval aviation?

Mr. LaGuardia. Yes.

Admiral Taylor. In some respects we are ahead of them.

Mr. LaGuardia. Have we as many dirigibles as England?

Admiral Taylor. No.

Mr. LaGuardia. Have we floating airdromes?

Admiral Taylor. No.

Mr. LaGuardia. No?

Admiral Taylor. You mean ships?

Mr. LaGuardia. Yes.

Admiral Taylor. We have a mother ship which accomplishes the same purpose for the type of boat which we use. In England, apparently since the united air service began, for some reason, the large type of floating boat which was being developed by the British Navy is apparently not being developed now. We are carrying on that development and we have now, with the two fleets, aviation detachments, one with the Atlantic Fleet and one with the Pacific Fleet. So far as I know, the English have now no such detachment with

their fleet. They have planes on board battleships, and we have some also, but they probably have more planes on battleships than we have.

Mr. LaGuardia. They are also ahead of us in the matter of dirigibles?

Admiral Taylor. They have several large rigid dirigibles. As regards small dirigibles, we have all we need or can use. We have built something like 30 of the small dirigibles and we have since supplied the Army with some of them. We have not so many now.

Mr. LaGuardia. Have you kept in touch with the attitude of the British Navy in reference to their separate air service?

Admiral Taylor. I do not say that I can speak for the British Navy as to their attitude. I have tried to keep in touch with British opinion as regards the united air service, and some of it is very unfavorable at present. Probably you know there have been recently charges of gross mismanagement of the air service there.

Mr. LaGuardia. That seems to happen in the best of families.

Admiral Taylor. That has never happened in the American Navy, and I think it never happened in the British Navy.

Mr. LaGuardia. The Army is now training your men, is it not, in Army schools?

Admiral Taylor. I believe the Army is training our aviators to fly land planes, but that is not my department.

Mr. LaGuardia. I want to go back for a moment to some of the dirigibles you built for the Army. Those you turned over to the Army are the same as those you built for yourselves?

Admiral Taylor. The same thing.

Mr. LaGuardia. The flying is just the same?

Admiral Taylor. Yes.

Mr. LaGuardia. So, in the final analysis, there is a good deal of the flying and the aerial work that is alike for the Army and the Navy?

Admiral Taylor. Yes; if you are driving a motor car it is alike in the Army and Navy. But the actual act of flying is only a part of naval aviation.

Mr. LaGuardia. You would train your own observers and spotters and they would go along with the fleet?

Admiral Taylor. It is a good deal more than that, Mr. Chairman. Figures vary and statistics are very deceiving, but I believe that not 1 per cent of the aviation man hours are in the air. For the rest of it you have your service on the ground; in Naval aviation you must have people aboard ships, and, as I understand the matter, under the New bill the Air Service would have a Navy of its own. The bill provides for the transfer of ships, vessels, and boats.

Mr. Hull. You are at the present time coordinating with the Army in aircraft work, are you not?

Admiral Taylor. At the present time there is a joint board which coordinates any questions which come up, but as regards the aspect I am particularly interested in, the technical work, we are in absolutely close contact with the Army. Our people deal with them every day. They know what we are doing—we know what they are doing.

Mr. Hull. There is no difficulty as far as that goes?

Admiral TAYLOR. There was no difficulty during the war and there is no difficulty in time of peace, that is, if people wish to cooperate, which the Navy always has done.

Mr. HULL. If a separate board was created by law, something similar to the present board, you would have no objection to that, so far as I can understand your position at the present time?

Admiral TAYLOR. We had such a board by law during the war, which avoided all conflict as regards matters of production. There was no conflict there, and I may say it was that board, with the approval of the Secretary of War and the Secretary of the Navy, which made the allotment of Liberty motors. It was an allotment which was approved by the Secretary of War and the Secretary of the Navy and at the time I think by the higher Army authorities in France also.

Mr. HULL. Do you have any difficulty in obtaining planes at the present time?

Admiral TAYLOR. It is not an easy problem, because we try to develop and improve all the time. But there is no difficulty in building what we want or procuring by contract very good airplanes.

Mr. HULL. You have an engineering school for the development of improved airplanes?

Admiral TAYLOR. We try to call upon the private designers as much as possible.

Mr. HULL. But you have at Langley Field a development school?

Admiral TAYLOR. Langley Field belongs to the Army. Perhaps I could explain that by telling what we did last year after the armistice. The Navy effort had been devoted primarily during the war to the antisubmarine patrol, both abroad and on our own coast, and we were unable to develop fleet aviation during the war because it took all the energy we had for the specific work which was assigned to the Navy.

After the armistice we undertook seriously to develop as rapidly as possible the use of airplanes aboard ship, and we put out requirements early last spring. We advertised, laying down the general principles of what we wished. There were several bidders and we placed contracts with several of them. They were not perfect planes, but they were good enough to go on with and quite as good as anybody had at that time. We are carrying on that work along that line.

In the case of one plane, which was very satisfactory, we placed an order with the designer and we also arranged that we could build a certain number of them at the aircraft factory. We like to be able to build at our own factory a few of each of the planes we use.

Mr. HULL. Do you find that is economical?

Admiral TAYLOR. It is economical in the end, necessarily. Of course the aircraft factory is very much reduced now. At the time of the armistice we had between three and four thousand people actually working in the aircraft factory, but it was largely an assembly proposition. There were a number of plants working for us, outside, making our parts. We had the Victor Talking Machine Co. in Camden, N. J., doing a great deal of work. Actually, at the time of the armistice there were from ten to twelve thousand people contributing to the work of the aircraft factory.

We canceled those contracts as soon as we could and there were about 1,200 people working in October. They are still being reduced—we are getting down to a small permanent peace basis.

Mr. HULL. The Navy has a great many manufacturing institutions in the navy yards, and the Navy acquires a great many of their own supplies by manufacturing them?

Admiral TAYLOR. A number of them. We do building, not very much manufacturing work. The navy yards are used primarily for repairing and secondarily for building. The aircraft factory at Philadelphia is the only plant we have now building planes. It was not the idea to build all our own planes, because the Secretary's policy is to build some by contract and to build some ourselves.

Mr. LAGUARDIA. You can train mechanics there very advantageously, can you not?

Admiral TAYLOR. Yes; and we wish to be able to do that. In that factory, when it had between three and four thousand people working there, not 5 per cent of them had ever had anything to do with airplanes before they came into the factory.

Mr. MORIN. How many planes are you capable of turning out at the Philadelphia plant?

Admiral TAYLOR. If we work the factory at full capacity, depending on the size of the plane, we could make, of the small planes, perhaps ten a day, and of the large planes two or three a day. We never did get to full capacity, and at the present time we are not working at more than one-fifth capacity.

Mr. MORIN. How many men have you there?

Admiral TAYLOR. There were 1,200 there in October. But the factory is being used now for repairing and setting in order planes. A great deal of its work is along that line now.

Mr. MORIN. Is that plant capable of taking care of the needs of the Navy for some time in the future?

Admiral TAYLOR. It all depends on what the Navy has to build. It is not the idea that it should be the sole source of supply.

Mr. MORIN. That will be a very large and important plant, will it not?

Admiral TAYLOR. About four-fifths of it is now being used for storage.

Mr. MORIN. And will be maintained there permanently; is that the intention?

Admiral TAYLOR. So far as I am aware; yes, sir. I regard it as a very valuable asset.

Mr. MORIN. It is the only one you are going to maintain permanently?

Admiral TAYLOR. So far as I know. Of course, a station of that kind really does repair work and things of that kind.

Mr. MORIN. How many separate plants did you maintain during the war?

Admiral TAYLOR. In manufacturing?

Mr. MORIN. That was the only one the Navy had?

Admiral TAYLOR. We were doing work at about six or eight firms.

Mr. HULL. You find it an economical proposition to maintain it?

Admiral TAYLOR. We think so.

Mr. OLNEY. You do not contend that the Government can manufacture as well or as cheaply as the private industries? Private industry, if given a chance, can invariably bid successfully against the Government?

Admiral TAYLOR. Sometimes; not always.

Mr. HULL. If the Army should have a large engineering development plant such as the one that is contemplated at Dayton, would not it probably be of assistance to the Navy to cooperate with them there in the development of planes for the Navy?

Admiral TAYLOR. If they move the Dayton-Wright plant to the seaboard. We build seaplanes and flying boats, usually.

Mr. HULL. But that is simply an engineering school. Of course, they do not expect to make them at all?

Admiral TAYLOR. I thought you were referring to the Dayton-Wright factory.

Mr. HULL. No, I was referring to the engineering school at Dayton.

Admiral TAYLOR. We are in very close touch through our technical people with all of that work and we interchange information with the Army as a matter of routine. Anything that we find out we send them, and anything that they find out which is of interest to us they send to us.

Mr. HULL. You do not think that it would be to the disadvantage of the Navy if we had a coordinating executive department somewhat similar to what you have at the present time?

Admiral TAYLOR. I do not quite understand what a coordinating executive department would be. A body which would take care of the matter of production to see that there was no clash in production would be very desirable; but at present, with the small amount of production there is no difficulty. The difficulty is from the other side. We have no difficulty in placing orders.

Mr. HULL. You have no difficulty at all in obtaining what you want?

Admiral TAYLOR. We have difficulty, because it is difficult to improve the planes. That is our main problem and that is where, for naval purpose, an independent air department, I am convinced, would fall down.

Mr. HULL. Suppose you had the drawings for a plane, and the engines, how long would it take to construct a plane at this plant you have at present?

Admiral TAYLOR. If they were complete working drawings and there were no unusual difficulties in the way, it would take possibly three or four months. It would be a question of getting the material and getting into production.

The ground was broken for our plant in August, 1917, about the first of August. It was almost a swamp, and the first complete plane, a large twin-engine plane, was flown in the last few days of March, 1918. That was starting from the bare ground, although we had fairly complete plans of the plane. We duplicated the plane that the British were getting from the Curtiss people.

Mr. HULL. There is no great difficulty in the manufacture of planes by the Government if you have the material, the factory, and the personnel?

Admiral TAYLOR. No, there is no serious difficulty—at least we did not find it so. We had a most excellent man in charge of the factory at Philadelphia, who has now left the service and I believe is getting more money than anybody in the Government service except the President.

Mr. LAGUARDIA. Who is that?

Admiral TAYLOR. Naval Constructor Coburn.

Mr. HULL. Are there any patents that the Navy at times has to pay for?

Admiral TAYLOR. We pay $100 for the Wright patent and the other patents controlled by the Manufacturers' Aircraft Association.

Mr. HULL. $100 per plane?

Admiral TAYLOR. $100 per plane.

Mr. HULL. That covers everything?

Admiral TAYLOR. That covers everything, so far as those patents are concerned. There is a limit on that, and I think that will stop very soon.

Mr. MORIN. Where did that man to whom you referred to go?

Admiral TAYLOR. He went with the Bethlehem Co.

Mr. MORIN. What salary is he receiving?

Admiral TAYLOR. I do not know the exact amount.

Mr. LAGUARDIA. More than he got in the Navy?

Admiral TAYLOR. Yes. I had another naval constructor come in yesterday who is going to resign, and he is going to get five times as much as he is getting in the Navy. I do not think there is any danger of you gentlemen increasing the pay up to the figure a man can get on the outside.

Mr. LAGUARDIA. Admiral, would a national academy of aeronautics be valuable to the Navy, such as Annapolis and West Point?

Admiral TAYLOR. I hardly think so, Mr. Chairman, as far as the Navy is concerned. The principal education of the naval officer is at Annapolis, and so far there has been no serious difficulty in training graduates of Annapolis to make satisfactory flyers.

Mr. LAGUARDIA. You are perfectly satisfied with your own personnel and the development you get in aviation?

Admiral TAYLOR. No, sir; we are never satisfied.

Mr. LAGUARDIA. You stated in reply to a question by Mr. Hull that you could turn out a plane at your plant in three or four months if you had complete drawings. How long would it take to make a complete set of those drawings?

Admiral TAYLOR. That is about as definite as how big is a piece of chalk?

Mr. LAGUARDIA. Suppose you have a new plane, and have a model; how long would it take to make the complete working drawings?

Admiral TAYLOR. That would depend upon the number of people available. If it was a question of absolutely duplicating that plane, a reasonable number of draftsmen should be able to make working drawings for that in 60 days. In such a case, however, we would start to work long before we got the complete plans, and begin to order material say in 10 days.

We had an actual experience of that kind which may give you some light on that. In the latter part of 1917 we contracted with the

Curtiss people for a number of single-engine planes and agreed that they were to furnish plans for other contractors who were to make the planes. The plans were furnished the other people complete about the end of February, 1918. There was great complaint by the people in regard to the slowness of the plans and the inaccuracies, but the complete plans were furnished about the end of February, 1918. That was a plane for which at the time there were very few plans, which had been built as a sample, and I do not think they had ever made working plans. Those plans were made by experienced people, as experienced as there were in the country.

Mr. LaGuardia. Are the officers who are assigned to your aviation section kept there for any fixed time, or is that subject to change? They are not detailed as Army officers are to a staff department and then detailed back into the line after so many years?

Admiral Taylor. They are not detailed from the line. They are all technical people.

Mr. LaGuardia. The flyers, too?

Admiral Taylor. No, we have a few fliers in the bureau who are simply test pilots, detailed to the bureau, but we also get the benefit of their experience in connection with the design work. Then we have the regular people who look out for the work of the bureau. During the war we had a few regulars and a number of reserve officers. Now the section has been largely reduced and I think there are three regular officers, one temporary officer and a few reserve officers there still.

Mr. Hull. I was somewhat interested in Admiral Coontz's statement in regard to the future development of civil aviation. Do you agree with him on that?

Admiral Taylor. I used to think that way, but I am beginning to think that if the commercial development is ever going to come it is a little bit overdue.

I was abroad last spring, as you know, and in every country I asked what was going to be the development of commercial aviation. Every one talked in general terms as to what they were going to do. I find very little actual accomplishment anywhere. As a matter of fact, if you come to what is actually being done, and do not confine yourself to talking about what might come and what should be done, I believe the work of the Post Office Department is superior to anything that has been done abroad. They are running to-day between Washington and New York a regular route, which is the oldest regular route in the world of a commercial or quasi-commercial nature. They have run it with great success for 18 months. They are also running the longest commercial route in the world, from New York to Chicago, and they are soon going as far as Omaha.

I have been trying to find out for several months what is actually being done abroad in regular commercial work, but so far I have been unable to find anything that approaches the one postal service as regards time and the other postal service as to length and difficulty.

Mr. Hull. I quite agree with you there. I am rather inclined to doubt the value of the Post Office Service, as far as any great utility is concerned. It is a wonderful thing, but I do not know where the economy or the great benefit comes.

Admiral TAYLOR. Of course, these things must be settled so far as commercial aviation is concerned by whether it pays or not.

Mr. HULL. That is what is going to settle it, as to whether it is useful or economical. Is there anything which this Government can do which will ever decide that point?

Admiral TAYLOR. That is a matter, of course, which is of great interest. I am beginning to become a skeptic rather than a believer in commercial aviation. The matter has been gone into by Dr. Durand, who was the head of the National Advisory Committee for Aeronautics, which was acting during the war as a scientific agency for the Government, and who has made a report on that matter, which will be published by that committee as a part of its annual report. He goes very fully into the matter from the point of view of an engineer.

Mr. LAGUARDIA. What are his conclusions?

Admiral TAYLOR. He does not draw absolutely definite conclusions, but he takes the ground that the matter must be settled as regards commercial transport by the question of whether it will pay or not. He does not find so far that there is any service which does pay. He does believe there is going to be more rapid development in the sport side and that kind of thing.

Mr. LAGUARDIA. Is that not what we are up against? If this was a paying commercial proposition, we would not be trying to solve some of the problems we have before us now. We would have an industry going in this country and would be sure of a supply in time of emergency. Are we not up against the development of this industry, which I am sure you will agree is necessary as a fighting branch of the Government, so that in time of an emergency we would have the emergency upon us, as it stands now, without a supply of what we need. Do you agree with that?

Admiral TAYLOR. Not altogether.

Mr. HULL. This is true, is it not, that nothing the Government would do would develop it; it must be developed from within. Its own success must develop it.

Admiral TAYLOR. Unless the Government wants to spend a large amount of money in such work, which is not needed.

Mr. HULL. Then, if it is not practical, you can not make a success of it; is that not true?

Admiral TAYLOR. I believe, Mr. Hull—I speak primarily from the Navy point of view—if the Navy is going to have proper aviation, it has got to have it to-day and to-morrow and next year and 10 years from now, ready the moment we go to war. There is not going to be time when we go to war to turn commercial industry to making airplanes for the naval service. You have got to have an airplane service which will be as much ready as the battleships, destroyers, and submarines.

If you spend a large amount of money in developing commercial aviation on the theory that it is going to be ready for use the moment you go to war, you are going to waste money, as far as that point is concerned.

Assuming that you have proper aviation ready for the Navy when you go to war, the other question is whether you will be able to develop aviation construction and supply material as rapidly as you develop your naval aviation and as rapidly as you expend your

aviation material, and I think if the matter is properly handled there will be no serious difficulty in making an expansion which will take care of the naval needs as fast as they arrive practically. When you expand the Navy or the Army, you have got to take time to get men and to get your drilled army and to equip them.

We found in the naval aircraft factory, that starting from nothing, in six months we were producing planes. We could do much better the next time, and it could be expanded to take care of a large portion of the Navy needs. There would be other factories in the country which could be put into the service in the same way, and they will have some force available.

Mr. LAGUARDIA. Then do you believe, Admiral, if we do absolutely nothing to develop commercial aviation or to encourage the industry and just leave the matter as it is with the Army and the Navy that you can, without any additional expense, keep your Navy supplied at all times and have a sufficient air force in time of emergency?

Admiral TAYLOR. If you will give the Navy the money it needs to develop a proper air force it will have a proper air force at all times. I think that is the essential thing if you are going to be ready with the air force of the Navy as well as with the rest of the Navy.

Mr. LAGUARDIA. If we should give the Navy as much funds as it ought to have, and give the Army as much as it ought to have, do you think we can do this cheaper by uniting all our air activities?

Admiral TAYLOR. Do what

Mr. LAGUARDIA. Carry out the work in connection with the development of an air force.

Admiral TAYLOR. I think as regards the Navy that it could not be done more cheaply by a second party working for the Navy than by the Navy working for itself. As regards the amount of money spent on Navy aviation I believe a given amount of aviation service could be rendered by the Navy much more cheaply if it controlled the expenditure.

Mr. HULL. How much money did you have from the outbreak of the war up to the present time? How much was the appropriation for naval aviation.

Admiral TAYLOR. I can put that in the record for you. It is $285,016,119, minus $97,000,000, or about $188,016,119. That is for 1917, 1917–18, and 1919, fiscal years.

Mr. HULL. That is a two years' appropriations?

Admiral TAYLOR. Yes; less a rebate turned back after the armistice.

Mr. HULL. What I would like to know is the exact amount of money you used. Of course, that is the amount of the appropriation less the amount you turned back. And then I would like to have in the record——

Admiral TAYLOR (interposing). I have that.

Mr. HULL (continuing). The number of planes you obtained with that appropriation.

Admiral TAYLOR. That was used for other purposes than obtaining planes. I have here a copy of the report called for by Congress showing what naval aviation existed on the first of November, and that will be printed very soon as a document. That shows every-

we have. It is a complete survey of naval aviation. There
, report directed to be submitted on the 1st of December.
. OLNEY. I understand you would be against legislation for a
ıl controlling authority, even if the Navy and the Army had
ey wanted to spend?
miral TAYLOR. It would somewhat depend upon what the cen-
ontrolling authority would be. I have been a part of a central
ɔlling authority, and it worked very well.
. HULL. I see no objection to a central controlling body which
ıot go too far.
miral TAYLOR. I would like to see what the wording of that
sion was. I think if you start with the idea of an air depart-
to undertake to develop commercial aviation, whether it is
d or not, you will waste a great deal of money, many millions of
:s.
. HULL. I quite agree with you.
. MORIN. You are opposed to creating a separate department
:onautics?
miral TAYLOR. No, sir. If Congress wishes to do that, I would
xpress an opinion on that; but I am opposed to a separate de-
ıent of aeronautics handling aviation for the Navy, which could
e it for itself a great deal more cheaply and more efficiently.
. MORIN. You think it could?
miral TAYLOR. I am sure of it.
. OLNEY. I think that meets with our approval.
. MORIN. Did I understand you to say that if the plant at Phila-
ia was working at full capacity it could turn out three ma-
ɜ a day?
miral TAYLOR. The plant was originally designed with the idea
we would be able to make 1,000 small planes a year, such as
ool plane. But in December, 1917, there came an urgent de-
for more planes and we added a new plant, three times the
f the first. The enlarged plant should be able to turn out 4,000
planes a year. But now the plant is nearly all being devoted
ırage. It is not being worked now at over about 10 per cent
capacity, operating as an assembly proposition.
. MORIN. Do you know how many planes could be manufactured
s country when the war began?
miral TAYLOR. I am not sure as to the exact number, but very
The only factory of any importance at that time was the
ss factory. They had built planes for the Army and Navy
lso for Great Britain.
. MORIN. I have some recellection of some one testifying to the
that the capacity was about 40.
miral TAYLOR. Forty a year?
. MORIN. I am not sure whether it was 40 a year or 40 a month.
miral TAYLOR. The capacity was greater than 40 a year. The
was placing orders for more than that, and the Army also.
Curtiss Co. was turning out five training planes a day. By
before the new facilities came into production, we were pro-
g six or seven hundred training planes a month in this country.
. HULL. How long does a plane ordinarily last in peace time?
miral TAYLOR. Sometimes five minutes and sometimes two
We sent large planes last winter to Guantanamo, Cuba—

four of them flew from Pensacola and two from Hampton Roads—and they spent the winter at Guantanamo with the fleet and came back, and we found it necessary in the spring to renew only the surfaces. The planes themselves were still in fair condition. They had a great deal of service and did a great deal of flying with the fleet. They were used in all fleet maneuvers down there.

Mr. HULL. The engines last for quite a long time if you have fairly good luck with them?

Admiral TAYLOR. Yes, sir; and I think we have had excellent results from the Liberty. All our large planes are Liberty engine planes. Some of the gentlemen here can tell you better about it, but I think they fly 100 hours constantly without any serious overhauling.

Mr. HULL. We sometimes see statements in the newspapers to the effect that the life of an airplane engine is only a very few hours, but I have seen some planes that have been flown from six months to a year. There are a lot of statements made about that.

Admiral TAYLOR. I think that perhaps was the case three or four years ago, but I think now you get very much better service out of the motors.

I would like to say, Mr. Chairman, with regard to the air ministry that I see there is a great deal of enthusiasm in this country about the British air force. I would like to say that apparently the British Air Service is having serious trouble now. I do not know whether you would be interested or not, but the British papers are attacking it as exceedingly extravagant and very wasteful, and I am somewhat inclined to think if we turned the air services of our country over to a lot of amateurs we would have the same results.

Mr. LAGUARDIA. We expect to get some experts from the Navy.

Admiral TAYLOR. I think most of them would prefer to stay in the Navy. Before another committee of the House they asked me what I thought of it, and I advised them to appoint a permanent investigating committee at the same time, because they would certainly need it.

Mr. HULL. Has France tried to unite her air services?

Admiral TAYLOR. Last spring we went into that with the people in France, and they had no united air service. They had some difficulties. Since then there has been some coordinating body, whose functions I am not quite clear about, but I am sure they do not have exclusive authority, and the navy still controls its aviation de facto. It does not appear from the order just what the functions of this body are.

AFTER RECESS.

The subcommittee reassembled at 2.30 o'clock p. m., pursuant to the taking of a recess, Mr. Morin presiding.

STATEMENT OF CAPT. JAMES A. HEALY, AIR SERVICE.

Mr. MORIN. What is your name and rank?

Capt. HEALY. James A. Healy; captain, Air Service.

Mr. MORIN. Are you still in the service.

Capt. HEALY. Yes, sir.

Mr. MORIN. Where are you stationed?

Capt. HEALY. Washington, D. C.

Mr. MORIN. What particular department?

Capt. HEALY. Information Group, office of the Director of Air Service.

Mr. MORIN. You are an ace?

Capt. HEALY. Yes, sir.

Mr. MORIN. How many German machines did you shoot down?

Capt. HEALY. Five planes and one balloon.

Mr. MORIN. Captain, have you given any study to the proposition of creating a separate department of aeronautics in the Army?

Capt. HEALY. Yes, sir.

Mr. MORIN. Will you please state your views on it?

Capt. HEALY. My views are very much like those expressed by Maj. Biddle this morning. I am very much in favor of it.

Mr. MORIN. From the standpoint of a flyer, a man in the active service, what advantage would you say there would be in creating a separate department and having it under a supreme head?

Capt. HEALY. One advantage in creating a separate department under a supreme head would be in the training of pilots. In the aviation fields during the past war the commanding officers were men who had considerable experience in other branches of the service, such as Infantry, Cavalry, etc., and knew little about aeronautics. They compelled the flyers to undergo the same discipline and training as they would infantrymen. In many instances they had the flyers drill two to four hours a day, which they (the commanding officers) considered much more important than flying training. If we have an Air Service man, particularly a flyer in actual command of the united Air Service, this mistake will be avoided, because he will understand the temperament of his pilots and will know that a few hours' rest after being in the air will benefit his men more than drilling them for a lifetime. I believe we should have discipline in the Air Service, but we should have men enforce it who really understand flyers. The training of a pilot is as different from the training of an officer in any other branch of the service as day is from night. Another advantage would be that the head of the Air Service could move large units in much less time and with less confusion and duplication of work. At the present time if we desire cooperation we are compelled to request it "through regular channels," which takes considerable time, and we must be satisfied with whatever the Navy or Post Office Departments are willing to give us. The advantage to the flyers at the front would be that they would not be compelled to fly on days when the weather was very bad. I was ordered to fly over the "lines" on days that were rainy and with fog so dense that it was impossible to attain a height of 300 feet. Naturally we did not see any enemy planes because the Huns had more sense than to risk pilots and machines when they could gain very little by doing it. If we had a flying officer in command of large units these mistakes could be avoided.

Mr. MORIN. Well, do you believe it would be more economical for the Government to have a separate department?

Capt. HEALY. Yes, sir; I do.

Mr. MORIN. Do you think it would be better from the standpoint of production?

Capt. HEALY. Yes, sir.

Mr. MORIN. And prevent duplication of effort?

Capt. HEALY. Yes, sir; it would.

Mr. MORIN. At what point do you think it should be separate both from the Army and Navy, under the command of whoever might be head of the department of aeronautics?

Capt. HEALY. The only instance I can think of would be at the outbreak of hostilities in the event of war. The planes would be far in advance of the Army and would fly into the enemy's country anywhere from 20 to 50 miles. At this time they would be separated from both the Army and the Navy, but as soon as a definite "front line" was reached they would work with the Army under the command of the general of the Army.

Mr. MORIN. They could be assigned to the Army by the head of the department.

Capt. HEALY. Yes, sir.

Mr. MORIN. Have you any personal obseravtion that you would like to put in the record, or express to us here?

Capt. HEALY. Nothing except that I am very much in favor of it.

Mr. FULLER. What kind of work, for example, have you in mind that could not properly come under the Army or Navy in time of war?

Capt. HEALY. None that I know of.

Mr. MORIN. I do not think you understood the question. He means the point where you would be separated from both the Army and the Navy, and should be under the direct command of the department in operations. That is what you mean?

Mr. FULLER. Yes.

Mr. MORIN. Such as going out on raiding expeditions, bombing bases, and things of that kind.

Capt. HEALY. Well, that, of course, would be under the command of the air service squadron or group commander in charge of the planes going out.

Mr. MORIN. I think what Mr. Fuller wants to know and what we all want to understand is, At what point should they work independently of the Army or Navy?

Capt. HEALY. I can not see any because, if they were going to bomb a city, the order would come from the Army headquarters to the group commander in charge of the group of squadrons who would supervise the work and see that it was done, but indirectly it would be under the command of the Army.

Mr. MORIN. That order would very likely go from the commander of the Army to the group commander?

Capt. HEALY. Of the airplanes; yes, sir.

Mr. FULLER. Is there any work in peace times that would have to do with the national defense, for example, that could not properly be handled by the Army or Navy, that would call for a separate service?

Capt. HEALY. Possibly the carrying of mail from city to city.

Mr. FULLER. No; I meant that had to do with the national defense?

Capt. HEALY. None whatever because patroling the coast could be done by both the Army and the Navy Air Services combined.

STATEMENT OF COL. ARCHIE MILLER, AIR SERVICE.

Mr. MORIN. What is your name, Colonel?

Col. MILLER. Archie Miller, colonel, Air Service.

Mr. MORIN. How long have you been in the service, Colonel.

Col. MILLER. I was born in the service. My father was an officer in the Regular Army, and I have been a commissioned officer 22 years.

Mr. MORIN. Are you a graduate of West Point?

Mr. MILLER. No, sir; I went in the Spanish-American War as a commissioned officer, and during this time I have served in the Infantry, the Cavalry, the Quartermaster Corps proper, and then the remount branch of the Quartermaster Corps, and in the Air Service.

Mr. MORIN. Did you see active service in the Spanish-American War?

Col. MILLER. I saw no active service in the Spanish-American War.

Mr. MORIN. What branch of the service were you in?

Col. MILLER. I started out in the Volunteer Infantry and went to Cuba in 1898 and served three different tours in the Philippines with both Infantry and Cavalry.

Mr. MORIN. You are in the flying branch now?

Col. MILLER. Yes, sir.

Mr. MORIN. How long have you been in the flying branch of the service?

Col. MILLER. I have been in the Air Service about two years and a half.

Mr. MORIN. You went in at the beginning of the war?

Col. MILLER. Yes, sir.

Mr. MORIN. Just at the beginning of the war?

Col. MILLER. Yes, sir.

Mr. MORIN. Have you seen active service abroad?

Col. MILLER. No, sir, I have never been abroad. All my experience has been here in this country. My duties have been largely those of commanding the larger air service camps throughout the country. I have commanded three or four of such camps, both partially under the Army commanders of divisions, and also independently. In fact, on one occasion in Texas the division commander found it expedient to divert off from his command a few weeks after we inaugurated our camp, because he found, as he expressed it, that he could not take care of us.

Mr. MORIN. Will you state to the committee what different camps you were in charge of or in command of during your service?

Col. MILLER. I was on duty in the aviation headquarters here in Washington at the beginning of the war, and then was placed in command of Kelly Field No. 2 in Texas. From there I went to command the aviation camp at Waco, Tex., and later Camp Greene, N. C., and after that the concentration camp for shipment of squadrons overseas from Garden City, Long Island. Later that was made into a mobilization depot for air service troops, and likewise some troops of the line were handled, particularly casuals, and from there I came to Washington again about the time, or just before the signing of the armistice, to be chief supervisor, a position somewhat akin to an inspector general in the Army, and I also held the position as chief executive to the assistant director, and at that time,

while I was holding this position in Washington, the armistice was signed, and I realized then that something had to be done toward establishing the air service on a firm foundation because we realized that we had practically nothing at the beginning of the war. Gen. Kenly was then director of air service and greatly in favor of what was then termed a separate air service. I believe the term "united" would better express his opinion and mine at that time.

The CHAIRMAN. Instead of a separate, a united air service?

Col. MILLER. Yes, I think the term better expresses what I consider is a desirable thing.

Mr. MORIN. I agree with you.

Col. MILLER. In fact, the word "separate" indicated that it is entirely separated from the combatant arms of the Army and Navy, and I believe we require close cooperation with them in all of the work.

Mr. MORIN. A united air service under a separate head would probably be it.

Col. MILLER. Yes, sir. What the committee would consider advisable as to what that head officer should be is entirely immaterial to me as long as he has the authority. I do not care whether he is a member of the Cabinet or what you call him, just so he has the position and the responsibility so that we can place our finger on the man who is to blame, if things do not come right.

Mr. MORIN. Do you fly yourself?

Col. MILLER. Yes, sir.

Mr. MORIN. You are a flyer yourself?

Col. MILLER. I had great difficulty in qualifying. I was what might be looked upon as one of the older officers who came in from the Regular Army into the Air Service, and I do not want to infer that I had difficulty due to the fact that I was not perfectly capable of flying, but my duties were such and took me into so many places where flying was not available to me that I had difficulty in receiving sufficient instruction to qualify.

Mr. MORIN. Have you served as an instructor yourself? Have you been an instructor?

Col. MILLER. No, sir.

Mr. MORIN. You have not?

Col. MILLER. No, sir; not an instructor in flying, although I have commanded a number of Air Service stations.

Mr. MORIN. Well, now, you just go ahead in your own way and give us your general views of the advantages you see, from your experience, to the Government in establishing a united Air Service under a separate head.

Col. MILLER. I believe I mentioned that I was perhaps one of the original advocates of a united Air Service, immediately after the armistice. A few months after that Gen. Kenly was relieved from the Air Service and Gen. Menoher succeeded him, and it was published to the Air Service that it was not desired for officers to express their opinions unless they were called upon to do so, and I would like to say that from that time to this I have attended strictly to my own business in connection with that and only made statements where my superiors asked me my opinion on the subject.

During my service on Long Island as commander of aviation activities up there I have come in contact a number of times with

British aviation activities, such as the R-34, the arrival of the super-Handley-Paige, and I have also had some opportunity to observe the Navy in their work. In fact, the Navy really is supposed to be in charge of the handling of the R-34, but I think that any of those Naval officers who were on duty with us will agree that the Navy or the Army should not do anything very particularly that either one or the other could not do separately.

There have been some statements made on the part of some Navy officers that Army officers do not have the required technical knowledge to do their work. I do not claim to be an expert on that, but I would not be surprised if it is somewhat similar to the claim made by the Field Artillery that their Field Artillery officers had to go in the air, and we have disproved that to a large extent by placing one of our Air Service officers alongside of their battery commanders on the ground to inform him as to what our observers see in the air.

I believe, if opportunity were afforded, that we could do the same thing in connection with Navy operations, and, of course, the Navy officers would be available for that work, and to teach others to do that work who have not had as wide experience as some of them.

I notice along the coast a great deal of duplication of effort which costs money, in the Navy and Army stations here and there, that might be consolidated, and I really believe that less stations and larger ones are preferable and more efficient as compared to a number of smaller ones for that work.

In connection with experimental work, I think it is generally agreed that there is duplication going on all the time in each department having its own experimental branch, and there is no apparent means for one to know what the other is doing.

I have observed since being in the Air Service—in fact, before coming into the Air Service—that there was some feeling existed between the Air Service officers and the line officers, which I always thought was unnecessary, and which was brought about chiefly through the beginning of a new service. Most of the flying officers were young. It is a young man's game. Some of them were inexperienced in questions of supply, discipline, and sanitation, and I know that on a number of occasions this increased the feelings, and it was altogether unfortunate.

The war has resulted in a number of flying officers gaining experience in administrative matters, and I really believe that they could make a creditable showing if separated from the Army.

The particular reason why I want them separated from the Army is on account of the more satisfactory results that can be obtained in a commercial line of aviation. I found in the remount work officers who went out to purchase horses were greatly handicapped because most of these civilians did not know how to deal with the Army officer, and the Army officer did not know how to deal with the civilian, and I believe that pertains largely to the commercial end of aviation. I believe there are certain business methods involved and that members of the Air Service can acquire those business methods—in fact, a number have already done so, and it will work better all around.

In my experience in commanding large camps of Air Service troops I find that while a great many of our officers lacked admin-

istrative experience, they had the right ideas, nevertheless, and ran their work splendidly.

There was a great deal of feeling at times between the flyers and the nonflyers. I always looked upon that about in the same way as the feeling that existed between the aviation and the line of the Army. A great many of those nonflyers, when they had the opportunity, qualified as flyers, while a few others who would have liked to do so were kept on duties which prevented them from having the opportunity. I noticed in one of these bills a provision that at least 85 per cent of the commissioned personnel shall be flyers. I think that a very good provision at this time, because we have the personnel to fill those vacancies, or perhaps can obtain them.

There is also another provision there which would forbid the 15 per cent of nonflyers from ever exercising command. I think that that proviso is objectionable from two or three standpoints. In fact, I believe that such a proviso would afford the executive department of the Government a good excuse for vetoing such a bill. I believe that it is an unnecessary slam upon this small percentage of nonflying officers. If it is considered proper to forbid them from exercising command, then I think the bill should provide that 100 per cent of the Air Service officers should be flyers. Any nonflyer who has any red blood in his veins and who would prove desirable to the service will fly or attempt to learn to fly if he has the opportunity. If he will not do so I do not think we want him.

There are certain duties; that is, a small percentage of them, in the Air Service, that flying officers dislike. It takes them away from their flying and occupies their minds with matters that they would prefer not to think of while flying, and I believe if it is considered necessary at this time to have 15 per cent of nonfliers that no stigma should be attached to them. Either take them in as they are or leave them out.

As the result of this feeling that I mentioned there was some feeling at different times. Personally, I have experienced none of it, although I think there were good grounds for it on one or two occasions. One occasion I might recall in Texas. Personally, I never thought that this general could be blamed for what he did, because if I were in his place I might be selfish enough to do the same thing, but his camp and mine were fed by the same supply department. The camp supply officer gets his orders from Washington, and the general, being the senior officer present, was authorized to order shoes from his place. I secured in about three weeks a camp and a great deal of equipment to accommodate 18,000 Air Service troops. They were coming in on trains from all directions. We had clothing and equipage coming in by express. It was cold weather, December, 1917, and the difficulty was to find places to put these men who had enlisted promptly about the middle of December in order to evade the draft. This commanding general was bending all of his efforts to get his division overseas before some other general got his overseas, and it seemed that the ones who got clothing and equipped in the best shape were generally selected to go first, so his men were clothed, but the uniforms were somewhat worn, so they took all of my clothing after it had been sent to my troops, who were in civilian clothing, and some of them lousy and some sick

and in pretty bad condition when they came in there because they had been several days on trains a week or so after having enlisted in different cities and depots.

They took all of this clothing and took the uniforms off their men and turned them in, and we either had to take the clothing their men turned in or go without. I am speaking of this chiefly because I want to show that it is unnecessary to have any trouble over these things. I reported this to Washington, and, of course, never heard anything about it. I knew the clothing was gone, anyway, and I could see where the general was anxious to get his division overseas. He was not particularly anxious about what the Air Service got. He was looking out for his men and, naturally, I was looking out for mine.

But I think that had we had a separate Air Service at that time that camp supply officer would not have let that clothing go to the Army without authority from somebody higher up in Washington.

Mr. MORIN. Do you believe that these differences you have referred to could be avoided under a separate service?

Col. MILLER. I think they would be minimized a great deal. I can remember seeing the first fliers riding around in leather coats in Cadillac cars sometimes, and can see now how some of the older officers of the line felt about this. Perhaps they were using Dodges, or were walking, but they could not understand why that was so. Perhaps this officer who was riding in this Cadillac was on his way to some ship that was down from a cross-country flight, and undoubtedly was, but it was not understood, and I think a great many of those things are simply not understood.

I can look at it from both sides pretty clearly, having been in the service all my life. I noticed in connection with the operations on Long Island that we could very clearly handle the mail service and this survey work of the Geodetic Survey, etc., and keep our flyers in training and accomplish a good many hours of flight in useful occupation as well. In fact, right now at some of my stations up there from time to time we assist the Navy and let them use our stations for experimental work, and assist them with mechanics, etc., and likewise the mail service.

If they have a train coming in late they phone us to turn our lights on from the land or our field because they do not have suitable lights for night landing, and they also bring planes out to conduct their tests on our fields, but except when they do these things, or when we go to their fields, hearing they are going to conduct some test, those are the only times we are in touch with them, and I believe we should be in touch with each other all the time. We should all be in one Air Service and working with the different departments of the Government, assigning personnel that is particularly specialized in some one branch to these different branches of the Government. I believe it to be in the interest of economy for the Government to do this.

Mr. MORIN. Do you think it is possible for the United States to keep abreast of the other countries in the development of the Air Service under our present system?

Col. MILLER. No, sir. We do not have much of a system now. It is a sort of hit-or-miss proposition now. In a commercial way, I suppose you will have to——

Mr. MORIN. I mean under our present regulation of operating separately and independently of the Navy, and so on, the post office having their own branch of it, and so on.

Col. MILLER. We are all dabbling in things in an experimental way—everybody is testing out things—and then we find that somebody else has been testing out the same thing, and the Government is paying for it on both ends. The Post Office Department gets one type of plane, the Navy tests it, and then the Army tests it, and it has all been paid for in three different ways.

Mr. MORIN. Then you think it is impossible for us to keep abreast of the other countries?

Col. MILLER. Abreast of the other countries?

Mr. MORIN. Yes.

Col. MILLER. I am not so familiar with what the other countries are doing except from what I have observed in this country, and, of course, I have studied what I can read on it, and I am satisfied they have all gone ahead of us.

There is no reason why we should not only keep abreast but keep in advance of them. Our geographic situation is particularly fitted for advancement in commercial aviation, having so many large cities, and by the establishment of these air-mail routes through the densely populated sections from city to city, with available landing fields here and there, and emergency landing fields between the supply fields, I do not believe there is any reason why commercial aviation should not be a success from every standpoint.

Mr. MORIN. Then you believe that we are more likely to attain that advancement under a united service?

Col. MILLER. Yes, sir.

Mr. MORIN. Than we could under our present system?

Col. MILLER. I do think so, because they would all be working along the same lines then.

Mr. MORIN. How far do you think we ought to go in encouraging and giving assistance to private enterprises?

Col. MILLER. Go as far as they think they can afford to go on it—as far as the Government will be liberal with them on it—but require them to show something for the money expended.

Mr. MORIN. Where do you think the advantage would be from private commercial enterprises in the Government under the Air Service?

Col. MILLER. There are so many rapid changes in aeronautics taking place, in connection with aircraft, I mean, that they have got to keep manufacturing all the time a certain amount, and continuing experiments, because I really believe that some changes of very great moment are going to take place in connection with them.

For instance, we have here recently made some very wonderful discoveries, or inventions, I might say. One is this new reversible propeller, which is going to mean a lot. By changing the angle of the blades of the propeller upon landing they do not require such a big field to land in. I think that is a big step in the right direction. It is going to enable us to put ships into a smaller field and require less space.

Mr. MORIN. In time of war at what point do you think that the united Air Service should operate independently of either the Army or Navy?

Col. MILLER. In the very first part of it is where they will do that. It is something akin to what we have been taught is the function of Cavalry in the event of war. The first thing they are supposed to do is to destroy the enemy's cavalry or drive them back out of the way. In other words, screens are put out, and I believe that in the next war the chief function of the Air Service will be to destroy or drive off the enemy air force. That will be the first fight.

Mr. MORIN. Do you think that should be done separate and independent from any connection with either the Army or Navy?

Col. MILLER. Yes, sir; in the beginning. I think the Air Service commander should be held responsible for that duty, just like the Navy commander would be expected to handle the work on the sea, and the Army commander on the land; the Air Service commander would handle the situation in the air, as it relates to the enemy's aircraft.

Mr. MORIN. Of course, after there had been a well-laid plan agreed upon by all the different elements, or the branches of the Army and Navy——

Col. MILLER. They would cooperate in all their movements and inform each other as to what the general plan and scheme was.

Mr. MORIN. Well, at what point do you think that they ought to be in direct touch and under the direct command of the field force?

Col. MILLER. In the work of observation, the actual observation with the Army in the field.

Mr. MORIN. That extends to the limit of range of their artillery?

Col. MILLER. Wherever the Army commander desires that work done. The senior Air Service officer would be on his staff, and would be assigned there, just like the senior officer of the Artillery, the Infantry, or the Cavalry would be under him for that particular work, or whatever work he desired done.

Mr. FULLER. I would like to ask the Colonel where, in his opinion, he thinks the separate service would lead to a conflict in authority?

Col. MILLER. A conflict?

Mr. FULLER. In authority.

Col. MILLER. I can not see where there would be any conflict. In fact, if we had a united Air Service, the director or commander, or whatever you might call him, of that united Air Service, would be a very foolish man if he did not keep in close touch with the Army, the Navy, the Post Office Department and all other branches that had any use for aircraft whatever.

Mr. FULLER. I am speaking of in time of war when there would be certain activities of the aircraft forces entirely independent of the Army and Navy.

Col. MILLER. Yes, sir; and that would be conducted from behind the line, I take it, in all those cases. The line would be up there, and this independent air action would take place from behind the line as against something behind the enemy's line, and perhaps the air engagement would take place either over the enemy's line or over ours, or behind one of the other lines, but that would have nothing whatever to do, in my opinion, with the strategic or tactical situation on the ground, or the planes that were working with the

troops on the ground, which would be under the Army commander, whoever he might be, or the Navy commander.

In other words, a certain element of Air Service would do that observation work with the Army, while the rest of it would be engaged in this anticipated air battle, to eliminate the dangers from the enemy's aircraft.

Mr. FULLER. This force of airplanes, then, that you are speaking of as operating independently, would be independent all the time of that force?

Col. MILLER. It would be unless the Army commander called on this air department for more planes, and they would take whatever they needed to put in for observation work with the Army commander. I do not believe that any troops working with the Army should be independent in any way. The commander of an army has got to be supreme in that.

Mr. MORIN. When they are once assigned to the Army they would be under the direction of the commander of the Army?

Col. MILLER. Yes, sir; and the Air Service officer would simply be on his staff.

Mr. FULLER. The statement was made, I think, before the committee at one time, by an aviator, that the casualties varied at the different camps where they were trained according to the discipline. In other words, that where the commander of a camp imposed rigid discipline on the aviator, there were far less casualties and accidents of one kind or another, and deaths.

Col. MILLER. Well, I have heard that subject discussed in connection with the British training in this country.

Mr. FULLER. No; I am talking about our training camps.

Col. MILLER. Could I use this as an illustration of it? Their casualties in Texas were a great deal higher than any of our camps down there, but they worked everybody right up to the handle, and a great many of our officers believed that they rather wore them down and overdid it, but they claimed that all of this haste they were making would save so many lives on the other side if they rushed it through. Of course, discipline has a good deal to do with preventing deaths in a way. If orders are issued forbidding certain things, and it is well understood that those people who disobey those orders are going to receive a severe punishment, the prohibited things will not be done; so that this statement you refer to, I think, is true in a way, but is misleading.

In other words, they infer there that they need some Army commander and his rigid discipline in order to prevent the Air Service from running wild, but I believe that we have some officers in the Air Service to-day, which maybe we did not have at the beginning of the war, who are able to maintain just as good discipline as anybody.

Mr. OLNEY. In the recent cross-continent flights there were an enormous number of casualties, in which 900 aviators participated. What do you ascribe that to?

Col. MILLER. I was the control commander up here, and I had an opportunity to see all of them at the start, at both places, being also control commander at Mineola, and I could ascribe the causes of those deaths to several reasons; one, the most atrocious weather

we have had that I know of, on the occasion of both races; poor visibility, fog, rain, sleet. I think they were the main causes of the trouble. In one or two cases I have heard it stated that officers who entered the races had insufficient experience with the planes that they were flying. Well, I figure that they have got to get that experience some time or other, and really I would prefer to see them get that experience around a field rather than go on a cross-country flight with that type of ship.

I have heard some officers say that they thought the men who were making the flight in the DH in that race should have had 75 or 100 hours in a DH at least before attempting it. There is nothing to the story of officers having been drinking or addicted to drinking in connection with either one of those races. I believe I saw every officer that went out from there, and they had not only not been drinking, but they had been taking particularly good care of themselves, with the hope of winning the race.

Mr. OLNEY. Do you think that a stimulant of alcohol gives a man better courage to go into the air?

Col. MILLER. No, sir; I do not advocate that.

Mr. OLNEY. Or is he more efficient without it?

Col. MILLER. No, sir; I do not advocate the drinking in connection with flying.

Mr. OLNEY. It is just like running an automobile in one way, in that it makes the operator more or less inefficient.

Mr. FULLER. How about the fact that some stated that it would have been desirable if those men could have had 75 or 100 hours in the air?

Col. MILLER. Experience in DH work?

Mr. FULLER. Is there some sense in that?

Col. MILLER. Yes, sir; especially if you are going on a cross-country flight that way, because with a cross-country trip of that nature, with so few landing fields, and so far apart, if you are in trouble you have got to come down in a small field somewhere.

Mr. FULLER. How many hours did these men have?

Col. MILLER. I really do not know.

Mr. FULLER. You know they did not have as much as that?

Col. MILLER. I heard it said that a few of them did not have quite that experience with this particular type of plane, but I do not see that any great criticism could be made of that, because they might have met with an accident with it anyway, flying it when they learned to fly a new plane. When I say a new plane I mean one that perhaps they had not had a lot of experience with. Any cross-country flying in the United States, especially over a mountainous country, with practically no landing fields established, is a dangerous work.

Our flyers do hundreds of hours around the flying fields and there is seldom anything happens. Nearly all these casualties occur on cross-country work. I look upon these officers who lost their lives in these races as sort of pioneers, somewhat like you look upon the forty-niners who crossed the western country in the oxcarts, etc., they blazing the trail for others to come after; and somebody has got to do it.

There was a case of this kind that was particularly sad to me. I think it was a year ago last October or November. As assistant

director, I ordered some officers to fly from Columbus, S. C., to Langley Field, and to take one route going up and another one going back. I did not point out exactly what routes, but approximately where they would go in an effort to locate desirable landing fields through there, as practically no planes had been through there, and I wanted to get a line on that particular section. They flew to Langley Field, reported they had struck very bad weather, and asked permission to return by train; and I wired them to fly back by a different route, as that is what they had been sent up there for. One of those planes, on the way back, near Fayette, N. C., was flying high, from all accounts, and did not realize it was getting late, and when they came down it was dark on the ground, and they struck a tree, which threw them in the river, the river being out of its banks in an overflowing state, and both of them were drowned.

I feel that landing fields will be the greatest advancement for aviation in this country that we can have. In the days in the development of the automobile States required what is known as highway commissioners, and I believe those highway commissioners did more for good roads in the several States than anything else; and I believe in some sort of landing-field commissioners; and if such an office could be established it would be a great help.

I believe this united Air Service bill, with the provision which I believe it contains for giving the director authority to establish such fields and exercise supervision over them, will be one of the greatest advancements we can have, particularly those provisions whereby any plane coming through can secure gasoline, oil, and other supplies.

Mr. FULLER. How close together would it be desirable to have those fields?

Col. MILLER. It would be desirable to have a continuous route through, of course; but I think that most of us who have discussed that point are agreed that if we had them every 15 miles or every 20 miles we would be lucky. In fact, if we had them in every 50 miles to start with it would be a great help in that way.

Mr. FULLER. Then, between Washington and New York you would want, for example, five?

Col. MILLER. We would probably want two between Washington and New York where supplies could be obtained while the others would only be required to be emergency fields.

Mr. FULLER. Would the landing fields be of the same size?

Col. MILLER. They would not all have to be of the same size. Some could be smaller than others.

Mr. FULLER. Approximately, what are the requirements for a field?

Col. MILLER. A field for all types of planes now known would be probably 1,500 feet long, preferably 2,000 feet long, by 600 feet wide. It would be better to have it square or in an L shape, so that you could always land in into the wind, and not land on it in a cross wind. It must be free from obstructions, trees, stumps, ditches, and preferably have turf or sod. The surroundings should be clear of high trees, telephone wires, houses, and high buildings. That enables the ship to get in low as it approaches the field into the wind.

STATEMENT OF MR. EDWARD VERNON RICKENBACKER.

Mr. MORIN. What is your full name?

Mr. RICKENBACKER. Edward Vernon Rickenbacker.

Mr. MORIN. How long were you in the service, Captain?

Mr. RICKENBACKER. Approximately 20 months.

Mr. MORIN. Are you in the service now?

Mr. RICKENBACKER. No, sir.

Mr. MORIN. You have been discharged from the service?

Mr. RICKENBACKER. Yes, sir.

Mr. MORIN. What business are you in now?

Mr. RICKENBACKER. The automobile business.

Mr. MORIN. Were you in that business before you went into the service?

Mr. RICKENBACKER. Yes, sir.

Mr. MORIN. Did you enter the service in the aviation section?

Mr. RICKENBACKER. I enlisted in the Signal Corps.

Mr. MORIN. You have had a flying experience, as we all know.

Mr. RICKENBACKER. I had not had.

Mr. MORIN. You have not had flying experience?

Mr. RICKENBACKER. No, sir; I had not been up once in a plane.

Mr. MORIN. You had during the war?

Mr. RICKENBACKER. Oh, during the war; yes, sir.

Mr. MORIN. I know that, but I want to get it in the record. Now, Captain, you have studied the subject of a united air service, no doubt, and we would like to have your veiws on the subject of a united air service under a separate head and whatever advantages you think it would be to the Government in the way of economy and also in the way of giving better service in time of war.

Mr. RICKENBACKER. Well, I might start in on our present basis, considering the fact that we have had a war and are looking forward to one. Primarily, we are the inventors of the airplane, as we all know.

Mr. MORIN. I forgot to ask you, but I think it would be well if you would give us here, for the benefit of the record, to show your authority to speak, your experience in the war, what service you have had in the war, and something of your experience during the war, and then you may give us your views on this subject.

Mr. RICKENBACKER. Well, going back six months previous to the time we declared war, I was interested in the automobile industry as a mechanical engineer and was also interested in motor racing. In December, 1916, I sailed for France, or England, France, and Italy, to go to visit those countries and buy two racing cars for myself for the coming season. I knew that there were two Sunbeams available, an English car. I secured passports in December and sailed—I think it was the 15th of December—for Liverpool. On arriving there I was questioned by the intelligence bureau officers, and since there was an embargo on anything pertaining to steel in the United Kingdom they questioned my right to enter England. It also developed later that about the time I sailed from America the British were looking for a particular German spy in this country whose description I seemed to answer, so they probably thought, since I had Rickenbacker attached to me, that they had the man they

were after, and they could not understand why I should be coming over in war times to purchase racing cars, knowing there was an embargo on them.

However, they searched everything I had, cleaned out everything I had, and pried the heels off of my shoes, and decided I had not sufficient reason for entering the United Kingdom; so I was ordered to stay on board ship and go back.

Christmas came around and I persuaded the man in charge of the port to permit me to spend Christmas on land. He agreed to let me off if I would go to the Adelphia Hotel, but I would have to be watched. I spent Christmas Day and the day following at the Adelphia Hotel, and got into communication with Mr. Cotelene, who was managing director of the Sunbeam Motor Works at Hampton, and he verified my status with the Intelligence Bureau, and they permitted me to proceed to London.

I arrived in London and spent a few days in London, and then proceeded to Wolverhampton. They had the cars there and said that it would be agreeable to them to let them go for a consideration, provided I could get permission to release them. They were of no value to the Government, and I had made arrangements with the Government to release the cars when they were in shape.

During this period I spent the week end in London in my room at the Savoy Hotel, overlooking the river, and I was able to see these different types of planes from the schools just outside of London that came down there, and I had occasion to meet and talk to many different army officers from all branches of the service, and I realized how low the morale was in the British Army, and also the French at that time, and that it was only going to be a question of time until the United States would have to enter the war on the side of the Allies.

I became quite enthusiastic over it. Of course, looking around to see what branch of the service I would decide to pick for my own interests, and in which I would be most eligible, I decided that the air service was the natural branch for me, so I took considerable interest in it, and, in fact, at one time was so enthusiastic that I was on the point of enlisting in the British air forces, but I did not, and the 1st of February came around, and diplomatic relations were severed, and Mr. Cotelene introduced me to a friend of his over in London whom he thought was able to get room on board the *St. Louis*, and I sailed on the 5th of February and shared his stateroom.

I left all my papers behind. The Intelligence Bureau insisted that I would have to, stating that they would be forwarded to me after the war, so I left them with Mr. Cotelene.

I returned to New York and spent a week or 10 days there, progressed westward to Cleveland, Columbus, Detroit, Chicago, and went on to Los Angeles. At all the different cities I noticed a familiar English face that was trailing around after me, and I knew that I was being followed. They no doubt had gotten in touch with their service in the United States and wanted to verify my status. After arriving in Los Angeles, I stayed at the Alexander Hotel and spent two weeks there. This same chap came up and introduced himself on some innocent pretext or other, and I did not ask him why he introduced himself, but I asked when his Government was

going to find out I was not the Crown Prince of Germany. He said: "Mr. Rickenbacker, that is what I have come up to you for, to tell you that I have investigated you pretty thoroughly, and I find that you are all right, and we have agreed to leave you alone." He said: "I wanted to thank you for the wonderful trip I have had since leaving Liverpool on your trail."

At that time I was very much interested in motor-racing sport, and I thought that the boys in the fraternity would be eligible as aviators and would make better material than a man coming out of any ordinary walk of life, due to the fact that they had motor knowledge, a liberal knowledge of motors, and were able to judge speed and distance, and at the same time were more or less informed in worldly experience. I conceived the idea of organizing a squadron of these boys, so I spent several hundred dollars and got the boys at home to agree to this plan, and since we had developed a high-speed motor at that time that was ahead of the airplane motors that were being designed, and we were forced to get the maximum efficiency out of a certain limited number of cubic inches, I thought our experience put us in position to tell something about a motor, and I thought the mechanics who had followed this work would be in position to make excellent personnel for these boys.

Most of them averaged 25 years of age. So I took it up with Capt. Kilner and learned that there had been no appropriation allotted for such a project and, furthermore, I had not had a college education, which was against me, and I might say that 60 per cent of the boys that I was trying to interest had not had a college education.

When I brought up the question of motor knowledge, the knowledge of speed and distances, and the ability to make quick decisions, they decided that that was a detriment instead of an asset. They said the more knowledge a man had of motors the less efficient he would be as an aerial fighter. I naturally did not agree with them, but my plans were stopped, and it was while I gave up hopes of ever getting a squadron together—while I was in Cincinnati in May, preparing for the Memorial Day event—Maj. Lewis, who was then Lieut. Lewis, was then in Washington and called me up in the evening about 8 o'clock and asked me whether I cared to go to France.

Pershing was sailing with his staff, and he said it was a secret sailing and I must not say anything about it, but if I cared to go I could as one of the staff drivers.

I realized the advantage of that, incidentally considering it with an ulterior motive. I knew that if I once got to France or England and they learned to know me that I would probably have no trouble being transferred into the aviation corps, and I would there have the advantage of getting the early training on good ships of the type that had been used at the front by instructors who had had service at the front, so I said, "Call me up in the morning," and he did at 8 o'clock in the morning, and I said, "Yes; I will be there in about 10 days," telling him that it would take that long to get the race off my mind and turn over my personal affairs to a friend of mine who was able to take care of them for any length of time. He said, "If you are not here to-morrow morning there is no use of your coming. I said, "I will be there."

After giving it further thought, I arranged with a friend of mine to take care of my personal affairs, and left Cincinnati at 1 o'clock, went up to Columbus and stayed there an hour and a half, with my mother and left that evening for New York, enlisted that afternoon, arrived there the next morning and enlisted that afternoon, and sailed the following day for France with Gen. Pershing and his staff on the Baltic, and arrived at Liverpool in a week's time, and went on to Paris, arriving there on the 9th of June, 1917.

I stayed there until the 25th of August, driving for the staff, the Aviation Corps, all the time trying to be transferred into the Aviation Corps. There were no facilities at that time or any arrangements made with the French to take care of American flyers, but they finally were made, and I received my orders on the 25th of August to leave immediately.

At that time Capt. James Miller, who was president of the Corn Exchange Bank in New York, arrived in Paris with one of the first reserve squadrons. He had been assigned to the duty of commanding the Issoudon School in France, which was to be a perfection school. He said, "You are just the man I am looking for." I said, "What for?" He said, "To be chief investigator. I need your mechanical knowledge." I said, "I am sorry, because I have just gotten orders to go to Tours and get my preliminary training there." He said, "If there is anything I can do along those lines that would be of help, I will be very glad to do it. I do not want to do anything that is going to interfere with your receiving an early training, but it can be arranged all right. You must have a certain knowledge as to how these schools should be handled from a mechanical end, and there is no reason why you can not acquire complete knowledge at Tours while you are getting your preliminary training."

I arrived at Tours on the 26th. It was just 17 days before I had completed my brevet test, from the knowledge I had gained over there. In the meantime I collected considerable data, wrote out a table of organization, what I thought a school would need and the pupils they were going to train, and the planes they expected to have.

It was on the 1st of September that I went back to Paris, and there ordered considerable machinery, finished up my organization, selected the men I needed, and on the 9th of October Issoudon was opened up. The first official flight was made in a Nieuport, model 15, by a French instructor. It was my duty to keep the planes in shape and condition, to build up an organization and perfect the organization, and see that the school and the ships were in condition to be turned over to the training personnel at all times in the numbers they wanted.

In the meantime, in my spare time I would pick a ship up and go off and try out my own ability according to the way I saw fit from the information I secured from the instructors.

Mr. FULLER. Still without the college education?

Mr. RICKENBACKER. And it kept me very busy until about the week before Christmas, when the first class that finished up their training were permitted or had been ordered to the Caszeau School of aerial gunnery, so I made application to the major who was then in command of the school to accompany them, as I was listed as one of the students in the school. As I had not taken the course

and perfected myself, he said, "No; we can not permit you to go, because you are too valuable in a mechanical way, and you will have to stay here."

I had a subordinate who wanted my position, but he was not qualified to do what I thought I was able to do, but he wanted to do his best, and he was qualified to handle the job I was handling, probably, in a better way than I, so I conspired with the surgeon to go to the hospital with a case of the flu. I did have a bad cold. I stayed in the hospital two weeks. In the meantime, I confided to this man who was assisting me what I was going to do, and I wanted him to show that he could run the job just as well as I, if not better, and to go ahead and assume responsibilities and accept it as his position. He did; and after two weeks I called on the major again and asked him how things were running. He said, all right, and handed me my orders to Caszeau.

I said, "What has changed your mind?" He said, "I am on to your little game. You are no good around here, anyway, if that is the way you feel about it." So I proceeded to Caszeau, where I received my instructions in aerial gunnery.

At the end of February we proceeded to the front. Some of the boys went to England, and some of them went on the way to the front. I was with the boys who were going to the front. At that time the arrangement or understanding was that we were to join the French squadron and be trained with the French squadron. On arriving at Paris that arrangement had been changed, and they decided to have the first instruction center at Villaneuve, just east of Eppernay and the Champagne sector.

Maj. Atchison was in command, and we spent three weeks waiting for orders in Paris and proceeded to the front in the latter part of February. We were there a few days when we were ordered to Paris to try out a Nieuport of type 28, which we did. On returning, the Ninety-fifth Squadron had been organized and was in command of Capt. James Miller, and on returning, I found that the Ninety-fourth Squadron had come up from the school of aerial gunnery, and I was assigned to it.

Maj. Lufberry was also assigned to it. Capt. Hall, from the LaFayette Escadrille, Capt. Maher, and Capt. Peterson were made respective flight commanders for the squadron. We did some maneuvering, trying to get the planes in as good conditions as we could, fitted our guns to them, and Lufberry took Lieut. Campbell and myself over the front, over the Champagne sector just once, when bad weather set in.

We were there probably 10 days longer, and received orders to move to Epieds. We flew to Epieds, that was south of Toul. The Ninety-fifth Squadron followed, but their fellows had not aero gunnery training, so they were sent back to Caszeau, and we, on the 10th day of April, 1918, moved to Toul airdrome, which is north of Tours. Maj. Huffer was in command. We had our planes in very good conditon. The squadron was well organized, and on the 14th day of April, 1918, we made our first official flight by an all-American squadron.

That was composed of Capt. Peterson, Lieut. Chambers, and myself, and we were ordered out at 6 o'clock in the morning. The

weather was not any too good. We agreed to meet at 500 feet over the airdrome. Capt. Peterson had previously instructed me to take command of the flight in case he had any motor trouble, finish the patrol and return. He came up, made one circle of the field, and went back and landed. I naturally took it for granted that he had motor trouble, and we started for the front. Chambers followed. We did not know we were over the front until antiaircraft shells started to break around us.

We located the Meuse, and patrolled between the Meuse and the St. Mihiel for two hours at an altitude of about 18,000 feet, all this time being fired at by antiaircraft guns. When we started home at the end of two hours I found a strata of cloud had moved in over the section where our airdrome was located. I was greatly at a loss to know where I was, but I found a hole in the clouds and went through thinking Chambers was following. I located the Meuse River and followed it south until I came to a junction in the tracks that I recognized, and landed at the Toul airdrome just about the time I was out of gas.

Chambers had not showed up, but landed at another field and showed up later on in the day. There started our official operation.

Then I gained the confidence of Maj. Lufbery, who was then our American ace, or ace of aces, with 17 victories to his credit, a very capable fellow, very conservative, and did a lot of flying alone. I realized the advantage of his experience, and knew that I could learn a lot if I could convince him that I was willing to learn.

I did convince him and I made many patrols with him, and his instructions were always to stay above him in case of a fight and look on, be an observer, and only come down and assist in case I thought, in my judgment, that he needed assistance. He said he was capable, and that occasion did not come up, but the experience was invaluable to me as the first time I got into a fight I knew how to go at the other fellow and from that time on I was more or less successful.

We were then flying Nieuport planes, which were the only thing we could get, the model 28. I had trouble with the plane one morning in a fight. Diving on three Boche the upper wing collapsed. Meissner had had the same trouble previous to that in a fight with a Hun he brought down, but he though that he collided with him, and that was responsible for the accident, but I could never figure out how it happened. I did not express my views to anybody else, but in this dive on the three Huns my upper wing collapsed and I realized that it was a defective plane, and not a case of collision.

But I returned to the airdrome, fortunately, without any trouble, landed, and let it be known that I had collided with the enemy, but took it up with Maj. Atkinson, who was our commanding officer, and told him what my honest views of the planes were. I was afraid to let the other boys know about it, for fear it would affect them and hurt the morale.

He seemed to feel the same way about it. We continued to fly those planes until a period arrived when there was considerable agitation as to whether anybody would fly them or not, owing to the numerous wings collapsing, and the fact that we had lost one of our best men through that sort of experience, Capt. Hall. They were

also very vulnerable, on account of the location of the gasoline tanks. One tank was in the cowl of the plane ahead of the pilot's face. Another tank was on the side of the plane in the fuselage. It was an oblong-shaped affair, and they were in a very dangerous position in case of fire. I think probably that the one thing that ever pilot feared over the front was fire. I know it always gave me shivers when I thought about it. We had no road of escape in case we did take fire, and that was proven by Lufbery who, when he was set on fire by one of the enemy's flying balloons, jumped rather than stay with the plane and burn up, knowing it was the easiest way out, and meant death in either case.

It was not until July 6 that I received the first Spad plane to go with any of the all-American forces, and I happened to be in Paris, and called on the supply department there and asked them whether they had any ships which were ordered for our group, to be flown back. They said they did not have any Nieuports, but there were three Spads there, so I flew one out. On account of that, without consulting the commanding officer, I upset his plans considerably, and disorganized him, according to his views, and was severely criticized, and court-martial proceedings were threatened for my disobeying orders.

Really I had not disobeyed any order; I had jumped at conclusions. I was very anxious to get a Spad plane because I knew they were the safest of the two. I thought the other boys were entitled to them, and we had been promised them for 6 weeks, and they kept putting us off. We had an attack coming in the battle of the Marne, and we were going into a sector where there were innumerable Huns, and the best that Germany had, and we had to have something to be able to cope with them, and the Air Service was not qualified to do that, because the French had tried out the Nieuport plane before we ever arrived, and found them defective and returned them, and refused to use them. It was the only thing available, and when we got enough fellows to start in to fly we were tickled to death to get them, in order to get busy and be able to do something.

Mr. MORIN. You continued in active service to the end of the war from that time on?

Mr. RICKENBACKER. Yes, sir.

Mr. MORIN. How many victories have you had to your credit?

Mr. RICKENBACKER. Twenty-six official.

Mr. MORIN. That is a very interesting experience. Mr. Rickenbacker, will you present your views on this united Air Service, and what the advantages would be to the Government, from your experience?

Mr. RICKENBACKER. Primarily, on the front, I think the fact that we had advertised that we were going to have 100,000 planes and 20,000 aviators on the front by April, 1918, was the worst thing in the world we could possibly have done. The Germans got busy immediately and enlarged their industry and manufacturing facilities, increased their training facilities, and when April 1 came around we did not have a plane on the front and they had twice as many as they would have had had not we given them advance warning.

As far as a separate air service is concerned and its value to those on the front, I think the reasons are innumerable. There should be

an Air Service head the same as there should be a head to any other organization, whether it is in business or running the Government, or no matter what it is, who is held responsible for what is produced and when it is produced. As it was, the Navy had their ideas of what should be produced for them and for their needs. The Army had their ideas of what should be produced for their needs. The Mail Service had the same, and the result was that they were always crossing each other.

They could never agree on account of the petty jealousies which existed between the different branches of the service, causing a great amount of money to be spent uselessly and wastefully by a lack of coordination. Had we had at that time an Air Service head or an independent Air Service, it would naturally have meant a Cabinet officer at the head of it, who would have been responsible the same as our Secretary of War is for the Army, Daniels for the Navy, and Glass for the Treasury, and it would have been his duty to select men from the Navy and the Army who had been recommended as the best suited, and men from the marine service, men from the engineers of this country, men from the manufacturers, and placed them on a committee to get together and devise a scheme whereby the Army would get what they were entitled to, the Navy would get what they were entitled to, and the Post Office, etc.

There would have been a considerable saving in money in that way, because everybody would have known what the other fellow was doing. They would not have doubled in each other's tracks. The authority of that chief in a responsible position would have been able to allot, after the planes were completed, the necessary amount, according to the demand, to either the Navy or to the Army, or where they were most valuable. If the Army at that time needed all the planes, they would have been able to get all the planes. If the Navy needed all the planes, the Navy should have had them.

He would have been able to direct the source of supply where it was suited or best fitted. As it was, the Navy had a lot of planes and were utilizing the industry to a certain extent, and demoralizing the Army's organization; who really need the planes and were entitled to them more than the Navy, and that automatically would have been eliminated.

Then, as I saw it from the other side, the British came over here and sold one faction that was at the head of the service to-day their designs, and that organization, or that faction, put that type of plane into production and was all tooled up for it, and ordered a lot of material for that type of plane and was ready to produce when they were thrown out and another faction came in, and the French came over and sold the French type of machine to this faction, and the British type of machine was thrown out.

All of this was a waste of money, tooling an organization for that type of machine. And then the Italians came on with their type, and they started all over again in a sort of endless cycle. That could have been eliminated and would have saved this Government probably millions of dollars. This man would have been able to produce a producing organization in the Cabinet separate from the experimental organization. There should be two distinct organizations, the experimental organization to secure the ideal, if possible, or what was the nearest to the ideal.

When that was ready for production and had been thoroughly tested and qualified for service at the front, whether on the high seas or over land, that machine would go to the production organization, which would be flexible enough to pick out an obsolete model, discard it, and bring in the new model. That would have eliminated a great deal of our troubles we were having with experimental planes.

And there should be a separate organization for research work to encourage our inventive genius and to develop and test and try those inventions after our genius had produced them. As it is to-day, we invented the airplane, and the inventors came to Washington and tried to convince our Government that it was the coming thing. They had finally to go to Europe to sell their invention. Instead of we being the leaders in aviation to-day, we are more or less a second-class power in aviation, or even a third-class power. Instead of having the rest of the world purchasing airplanes at our back door and at our feet, we are at their back door and at their feet trying their ideas and their planes.

A separate air service would have eliminated such difficulties as we experienced on the front regarding the parachute. As I say, there is one thing that all aviators feared, and that was the possibility of going down in flames. It was the only thing that I feared, and when we knew that designs could have been perfected, such as the Spad, for illustration, we could have had a detachable gasoline tank which, by a kick of the foot, would have been set loose or cut loose from the plane and saved the pilot from being burned up, and he could have volplaned back to mother earth. Or they could have equipped those ships with parachutes. Parachutes go back as far as I can remember. In my kid days I remember going to the fair and seeing balloon ascensions and the man jumping from a parachute or from a series of parachutes. It was merely a matter of perfecting.

I do not believe that those who had the interest, or are supposed to have had the interest, of the boys at the front at heart gave the parachute any serious thought until the war was practically over. A great many times when I got into combat with German planes I set several on fire and saw the pilot calmly and deliberately step overboard, his little parachute cut loose, and he would fly back to mother earth safe. Had I been set on fire in the same fight, as many of my freinds and very dear comrades were, I would have gone down to my death as they did.

There was no relief. They could not stand the fire and they had to jump, which meant death, but the Hun was able to save himself. Many times I brought that matter up, and it was during the Argonne Battle that I took it up with the experimental department in Paris. They thought so little of it, or were giving it so little thought, those who were in command, that they did not even have a responsible man at the head of the experimental department in Paris.

This man, when I told him or suggested to him that he perfect a parachute which would qualify for our use at the front, thereby saving our lives in case of fire, which was becoming more frequent every day, insisted that they had not personnel enough. Any school

child realizes that it is not personnel that you want for a development of that kind; it was a matter of brains. One man was sufficient personnel if he had the brains to go ahead, but they did not.

It came around to the point where finally, after I related several experiences that I had had with the Huns jumping out of their planes and landing in their own lines safely, I stated that I might even secure one of these German parachutes and copy it. It was good enough for the Hun and it was good enough for us, for saving our lives. That is all we wanted it to do, to save our lives. He insisted that I go out and shoot down and bring it back to him.

Well, it seems as though a few days later a fellow was brought down and the parachute was secured and sent into Paris. Weeks passed by, and a few Congressmen or Senators, I do not remember which, arrived at the front, and I talked so freely that I was always laying myself liable to court-martial, but they took it up on their return to Paris, and they found that this parachute had been dissected, and that these experts found where they could improve on it, and if the war lasted long enough we would eventually get it, and about three days before the armistice was signed a man came out to the front with several different types of parachutes, wanting us to try them out, after the Huns had been using them for six months and saving the lives of their aviators.

Well, these samples were looked over, and he left one for me to use, but the plane that I was using, the Spad, was not so constructed that it could be used or applied. The plane had to be designed for the parachute, or the parachute for the plane. It was a minor job. And as long as the war was so near over I never did use it. Had we had a separate Air Service, a man responsible for that particular branch, if he was the right type of man—a young, energetic man with executive and administrative ability, and one who had the power to visualize the future—he would have had a man long before they gave the parachute a thought, perfecting a parachute, and we boys at the front would have had one for each and every plane, and many of my friends that are now in France to-day would be back in America with their families and friends.

Mr. FULLER. Did the English and French have parachutes?

Mr. RICKENBACKER. The did not, nor did the English. The English did on their observation planes, some of them, toward the latter part of the war, but I think we made a serious mistake, in the first place, by underrating the enemy. I think any man who has been over there and seen the German ships fly and maneuver, and who has later had the opportunity to go into Germany, as I have, and see their equipment and their method of handling their aviation corps, will agree that Germany leads the world, or did lead the world at the end of the war in the science of aeronautics, and their ships proved that.

The scout planes were the best, were better than our planes, better than the Spad. I never voluntarily went into a fight with an individual. In the first place, an individual, may I explain, is not on the front unless he was qualified to take care of himself. He is not there alone. It was either that or he was a novice and had gotten lost from his formation. It was only a matter of a maneuver of two for position to tell whether that man was an expert or whether he was a novice. If he was a novice, it was his misfortune. If he

was an expert, I never attempted to attack him unless I had the initial advantage, and if I did not get him the first time I kept on going, because I realized it meant death if I stayed and tried to maneuver with him, because his plane could outmaneuver mine and could outclimb my plane, and it would have been foolhardy for me to attempt to stay with an opponent who had the advantage, to start with, and to that reason I attribute a great deal of my success; the fact that I tried to estimate my limit of chance, how far I could safely go and not overstep the bounds, and at the same time not stop before I got to the limit. It was just as bad to stop before you go to the limit as it was to go on over it.

A separate air service, I firmly believe, in time of peace is essential to the life of the industry itself, primarily because the industry can not survive the pioneer days without the Government supporting it to this extent, that they should in some way devise a scheme or a system of carrying mail which is profitable to the Government, and demand enough planes of the manufacturer to keep him working and keep his organization and industry intact.

That gives you a working organization in time of peace and a flying personnel in time of peace that can be converted over night into a war personnel and a war industry. We all agree that it has taken 16 or 18 months to get our airplane industry on a working basis or a production basis, and it took millions of dollars.

At the present, if we had a mail service with routes crisscrossing the United States, it would be a good thing. As I understand it, the mail service has proven a profitable venture for the Government up to date. There have been very few casualties, compared to the number of miles traveled by automobile or railroad. The Government would have at its command 5,000, possibly 10,000, or possibly 15,000 aviators who would be 70 per cent, and maybe 75 per cent, efficient toward being war pilots. You would have an enlisted personnel to take care of those ships, which is also a highly trained personnel, and takes months, sometimes years, to develop, at your command at any time. You would have the industry which, as we all know, has been demonstrated, as a good illustration, the truck industry. That is one thing that is able to be converted over night, and it was only a matter of weeks until the American manufacturers were able to produce a greater number of trucks than we really demanded of them.

That same thing and condition would apply to the airplane service, because the airplane fundamentally is or can be used for war purposes as well as peace time commercial purposes.

At the present time there are a number of uses that the airplane could be put to with great value, as far as the Government is concerned, showing that there would be no useless waste of money. One use would be to take care of our forest reserves. I remember last summer, coming back from Vancouver on the Canadian Pacific, we passed a forest that was fairly blazing. It had been blazing for six weeks, and the fire was 40 miles long. There were millions and millions of dollars of fine lumber going to waste. With a million dollars' worth of airplanes you can minimize that loss millions of dollars because the pilot is in position to locate from the sky a fire long before the present forest ranger can from the ground.

We would have perfected chemical bombs which a man in an airplane could drop on this fire and extinguish it immediately, or a number of planes could put a barrage around the fire, destroying the vegetation, making it impossible for those fires to spread, thereby saving us millions.

Mr. MORIN. From your experience, do you believe that we could obtain better service and greater results with a united air service under one supreme head?

Mr. RICKENBACKER. There is absolutely no question about it.

Mr. MORIN. And is that the general opinion or judgment of all the men who were over there in the active service?

Mr. RICKENBACKER. It is the general opinion of 90 per cent of your pilots to-day. The best illustration of that is this. In your present organization to-day you have not 5 per cent of the thousands of pilots that you trained and spent millions of dollars on training. You have not 5 per cent of those pilots in your service. Why? Here is a good example. I came to Washington, and after returning I thought there was a possible chance of putting my knowledge to some use or giving the Government some benefit of my knowledge gained during these two years of actual experience, and possibly it would be the pursuit in life that I would want to follow, but on arriving here I found conditions in such a chaotic state that I immediately resigned and surrendered unconditionally, not even being willing to stay in the reserve corps, because I did not feel willing to put my future in the hands of an organization that was as unstable as our organization was, and probably is to-day, our Air Service.

Had we had a supreme command at the head of our Air Service we would not have thrown away these millions of dollars' worth of planes that were left over from the war. We would not have destroyed any million dollars' worth. We would not be letting millions of dollars worth of motors and machinery lie idle, and probably rusting themselves away in warehouses and storehouses as they are to-day.

A supreme head would have had these different localities plotted. He would have a reserve squadron in Chicago, in Boston, New York, Buffalo, Omaha, Kansas City, Los Angeles, Seattle, and San Francisco. These cities, with the cooperation of the Government, would be tickled to death to lend their assistance and offer municipal landing fields, and would supply them. The Government could then take these planes and equipment and supply a reserve squadron, organized along the line of our National Guard, and keep these boys' hands in to be able to continue to fly, increase the interest in flying, and develop the science itself.

The Government could have supplied the enlisted personnel to take care of those ships. The result would be that under their control you would have a highly trained organization which would take care of your mail service, your forest reserve, and any other possibility or branch of the service that the Government would care to utilize the air service for. As it is today, 95 per cent of these boys have gone back into other walks of life and have given up hope. The money spent on them, the knowledge gained, has been dissipated, but it is not too late yet to get that spirit back.

STATEMENT OF COL. JOHN N. REYNOLDS.

Mr. MORIN. What is your full name?

Col. REYNOLDS. John N. Reynolds.

Mr. MORIN. How long have you been in the service?

Col. REYNOLDS. I have been in the service over 11 years.

Mr. MORIN. You are a Regular Army officer?

Col. REYNOLDS. Yes, sir.

Mr. MORIN. A graduate of West Point?

Col. REYNOLDS. No; I came from civil life.

Mr. MORIN. Did you enter the Army as a commissioned officer?

Col. REYNOLDS. Yes, sir.

Mr. MORIN. How long were you in the Air Service?

Col. REYNOLDS. I was transferred to the aviation section, Signal Corps, in October, 1916.

Mr. MORIN. Were you abroad?

Col. REYNOLDS. I was.

Mr. MORIN. Did you have actual experience over there?

Col. REYNOLDS. I was on the front from about the last of May until after the armistice was signed.

Mr. MORIN. Did you have flying service?

Col. REYNOLDS. Yes, sir.

Mr. MORIN. Just what particular branch of the flying service were you in?

Col. REYNOLDS. I commanded the Ninety-first Squadron until the First Army was formed, when two other squadrons were added to the Ninety-first, forming the First Army observation group, which I commanded.

Mr. MORIN. You say you were in an observation group?

Col. REYNOLDS. Army observation, long-distance reconnoissance.

Mr. MORIN. Now, will you please give us your views in regard to creating a united Air Service under a supreme head, and what advantages you think it might be to the Government, just as briefly as you can?

Col. REYNOLDS. From a military point of view, the only experience I had which would enable me to form any opinion in regard to the advantages of it in active operation was when I came in contact with the information section of the General Staff.

According to the plan under which we were working, we were getting information for the supreme command, and that on the sector some distance in the rear of the line, as our work began about 8 miles back of the line and went back as far as we could. At first, when I was on the front, I was working with the French Eighth Army. They really outlined the information they wanted, and left it entirely up to us to get that information. They had experience, and they knew the possibilities and the limitations of the Air Service. They never asked us for anything that was impossible. All of those requests came through from the Chief of the Air Service of the Army.

When I first started operating with the first American Army I got my instructions directly from G-2, from the information section of the General Staff, and they called on me to do things that were really impossible because of weather conditions, etc., and so on. Certain

things could not be done. They did not know what could and what could not be done, and finally, after considerable fighting, the proposition was changed so that they sent in their requests to the Chief of the Air Service of the Fifth Army, who then laid out the work for us, and it went very smoothly from then on.

But the whole trouble at first was the failure of the men on the General Staff to appreciate the limitations of aviation. After it was done in the other way everything was very satisfactory.

Mr. MORIN. Your work there was of the nature that it should be under the direct command of the Army, you being assigned right to the work of the Army.

Col. REYNOLDS. I might say that the general tactical control should be under the commander of the Army. The administrative control and the tactical control and the methods of employment I believe should be always entirely up to the man familiar with the Air Service work.

In other words, the high command states what general line of work should be done, and then it is up to the Air Service to work it out and do it.

Mr. MORIN. At what point do you think that a separate air service or a united air service should work independently of the Army or Navy?

Col. REYNOLDS. Well, I would say just at that point that the general tactical control should be in the Army or Navy, depending on which it is. That is, if it becomes a question of policy, the high command should state, "We desire a certain sector covered by your bombs," and that is all. When it comes to observation, and I am speaking now of long-distance occupation, which is purely a high command function; that is, the divisions do not care anything about what is occurring back of a certain point, for that work it should be the same thing.

We want to know certain particular things in regard to certain sectors, or we want certain sectors kept under general observation. Now, as to how that is done, as long as it is done, they should not interfere at all, because they do not know; they have not the technical knowledge.

Mr. MORIN. Then, from your experience, you think we would obtain better results from operations in time of war with the service united and under one supreme head?

Col. REYNOLDS. I do. One effect of these requests that were impossible of execution coming in was to decidedly decrease the morale of the personnel. One question in particular was the question of photography. We all know that photography can only be carried on on certain conditions of light, and we were called upon time after time, and actually directed, to go out and take photographs when everybody connected with the business knew that they could not get photographs.

Well, the men knew they run the risk of their lives absolutely needlessly because they could not get the results that were asked for, through no fault of theirs, but on account of physical conditions that they could not control at all, and it became a joke, but a joke that was seriously affecting the morale of the organization.

Mr. FULLER. Have you in mind any activities that could be conducted by the Air Service forces entirely independent of the Army or Navy?

Col. REYNOLDS. In time of war?

Mr. FULLER. Yes.

Col. REYNOLDS. I would say there was nothing that would be absolutely independent; no. I do not think there can be any operation in time of war that would be entirely independent of the high command of the Army or Navy, the military command.

Mr. FULLER. Then, how high above the point of production does this unity of service go? It is easy to see the desirability up to the point of delivering the planes, the experimental work, and all that sort of thing.

Col. REYNOLDS. Well, in the early Air Service tactics it has got to be separate, but as soon as operations start the general control should be in the Army or Navy, the general control, just as I outlined, that they should give a general outline of the work desired, and the results should be an Air Service function.

Mr. FULLER. Is that the way it was handled during the war?

Col. REYNOLDS. It was, as far as I know, with the exception of this original proposition where we received instructions, or where one group commander received instructions directly from G-2 of the General Staff—that is, the information section of the general staff—and that was what was unsatisfactory.

Mr. FULLER. How would you change that?

Col. REYNOLDS. Eventually it was changed so that G-2 sent requests for information to the chief of the Air Service of the First Army, and he in turn sent me instructions. That also avoided duplication, because at times G-2 had been calling on us for work that had been done by other squadrons assigned to divisions. The chief of Air Service knew that.

When a request came in for work of that kind that was being done by some other organization, he did not bother me with it. And I know of a number of instances before we got the thing working right, where we were duplicating the work of the corps squadrons.

As far as war-time things are concerned, that is the only advantage I can see. In peace times, as things exist at present, the development of military aeronautics depends entirely upon the development of aeronautics as a whole, I believe, and it has got to develop commercially. However, there are a great many things in regard to the development of commercial aviation that have to be brought up.

The places where it would prove most successful are not in competition with the well developed and perfect lines of communication that we have at present. For instance, it would be very difficult to really successful competition with the railroad system that exists between here and New York. The only element of superiority for commercial work that aviation has at present is its speed, and the ability to cut across country which is impossible for other forms of communication.

As an example of the point where it would be advisable would be between here and Norfolk. The trip down there by rail, I think, takes about 9 hours, and it can be done by air in 1 hour and 20 minutes. Those are the things that should be developed.

A point came up not long ago, in fact it is still pending in regard to radio beacons for the guiding of planes by the direction of radio. It is a thing that the Navy and the Army and the Coast Guard are trying to get together on. That is just one of the great many things that have got to be considered in the development of commercial aviation, and there is such a great number of them, and things that will have to be given such thought and worked out in such minute detail that it is shoving on to a department that already has enough to attend to, or more than it should have to handle, if it is left to the Army.

Also the control, in general, of things relative to aeronautics requires technical knowledge. It is perfectly possible to educate the General Staff, or whoever is going to control the destinies of the Army, if they are going to stay in office indefinitely in those positions, but by the time they were educated there would be other men coming in.

The result is that in order to have an educated head, if it is left as it is at present, would necessitate educating the entire commissioned personnel of the service.

Mr. FULLER. Have you in mind any other point such as the one you mentioned there of control that could illustrate the desirability of the unification of the three systems? Who would have responsibility for following those things out? Which one of the three takes responsibility now?

Col. REYNOLDS. In regard to the radio beacon proposition?

Mr. FULLER. Yes. I suppose you have dozens of cases in that category.

Col. REYNOLDS. The way I came in contact with this was in the preparation for this patrol from New York. There is a coast patrol from New York to Langley Field. I am trying to get radio communication along that route, although in this case I did not start out with the idea of getting it for direction flying purpose, but I merely decided that a patrol that had to wait until it got to the end of its route to make a report would be of very little value.

They should be in constant communication with the ground so that anything they see they can report at once. Practically all the radio stations in the country at present, as a war-time measure, are under the control of the Navy. They have some very definite rules and regulations in regard to the types of stations that can be used on the coast.

I was looking into the question of what radio stations there were. I thought there were none. But in doing that I ran into some of these regulations and find, following it up further, that the Post-office Department is preparing to establish these radio beacons along their routes for the purpose of guiding the machines. In misty weather, or anything of that kind, eventually it would become essential, when aviation had reached the point where they can fly irrespective of the weather. They have got to have something to guide them. Hearing is impossible.

Under certain conditions sight can not be used. When I say hearing, I mean the hearing of an ordinary sound signal. But they can use radio and have these automatic stations which will just send out a signal ever so often. They will be charted just as lighthouses are charted. As we extend commercial aviation over the country

those things have all got to be taken up and attended to. It is not a small problem.

This matter of landing fields will be a thing that will require a great deal of effort and thought, and there should be, as I have stated before, landing fields along the routes, not over 15 miles apart. Those would not all have to be first-class fields. There will be some towns and small places where it would be advisable to have landing fields, that would not be able to maintain them. The larger towns can, I am sure.

The establishment and maintaining of landing fields would be a very small thing, compared to the construction and maintenance of roads, and yet it would be just as essential. A good road costs from $10,000 to $20,000 a mile, and for the cost of constructing 20 miles of road you could put in three or four fields and maintain them, and some of the larger fields could be maintained at practically no cost, and possibly eventually be a source of revenue, but they have all got to be established, and until aviation has grown it has got to be done to a certain extent by the Government.

It will be impossible, or practically so, for us to keep in the military end of the Air Service, no matter what basis it is run on, with a sufficient number of planes to be really adequately prepared for war, unless we have some other source from which we can draw those planes when they are needed, and the only way we can have them is to build up and maintain a commercial aviation, always building those planes with a view to their being used for war purposes.

Mr. FULLER. I must confess that I find it rather difficult to figure out just where we should be dependent on the commercial development. It seems to me that the Government must be the pioneers in this movement.

Col. REYNOLDS. The Government must be the pioneers. They have got to start the commercial end of it, and they have got to prove that the commercial end will be profitable. Capital in this country is not going into too much of a gamble. I am convinced, and I think that a great many others are, that under certain conditions aviation can be a profitable carrier. I do not say under all conditions. It can not compete in some localities at present, but in others it can.

Mr. FULLER. Whether it can or can not, that is not an influential factor in this program, is it?

Col. REYNOLDS. In building up commercial aviation if it can not be made a profitable business, we can never interest capital in it.

Mr. FULLER. Whether it is going to be a commercial success or not, if we are going ahead with our program——

Col. REYNOLDS. It has got to be supported by the Government anyway, but if the Government can prove that it is a commercial success, that it is commercially profitable, then the capital of the country will take it up as a whole.

Mr. MORIN. We have got to go ahead with our program. The Government will be the pioneer in the proposition, and then let the commercial end of it develop as the result of the Government's experience.

Col. REYNOLDS. But there will be a place where it will be profitable, and where it will not be, and it is not a thing that can be done in a day. It has got to be thought out, and carefully thought out.

Mr. FULLER. To what extent are we in touch with the foreign development?

Col. REYNOLDS. I am not prepared to say; I do not know.

Mr. FULLER. How many flying fields are there around the country now; how many in important cities?

Col. REYNOLDS. In operation?

Mr. FULLER. Yes.

Col. REYNOLDS. I think there are only about four or five actually in operation.

Mr. FULLER. That is one of the first essentials, you consider?

Col. REYNOLDS. I consider ample flying fields the most essential thing. Next to that is the development of weather reports. That is a very necessary thing, and it is slightly different from the work of the Weather Bureau, because we do not care so much about forecasts as actual weather conditions at the different points.

Mr. FULLER. When a city makes an appropriation to purchase a field that meets the requirements, what other expenses in connection with that would they naturally fall heir to?

Col. REYNOLDS. You mean if a field was really to be kept going as a useful field?

Mr. FULLER. Yes.

Col. REYNOLDS. They should have mechanics, store spare parts, gas and oil, and hangars, and keep the field in condition.

Mr. FULLER. That would be developed at that point?

Col. REYNOLDS. Yes, sir.

Mr. FULLER. What is the inducement going to be to the city to do that?

Col. REYNOLDS. Eventually I believe the same inducement that there is for establishing a garage. You can charge a certain fee for the use of your field. You can sell your gas and oil, and you can charge for the time of your mechanics.

Mr. FULLER. But do you not think that if the city donated the field it would be up to the Air Service to maintain the organization?

Col. REYNOLDS. It could be done; yes. I think it would be an excellent idea, and if they did there would undoubtedly be uniform conditions.

Mr. FULLER. There would be no good reason to have them supported by the Post Office Department, would there?

Col. REYNOLDS. Well, I consider that the Post Office Service should be a part of the Air Service.

Mr. FULLER. Surely, I know.

Col. REYNOLDS. So it would be supported by the Air Service.

Mr. FULLER. I think one thing that is bothering the Members of Congress on this program is this: They feel a certain responsibility for the large appropriation that has been made and so little accomplished, and in contemplating a new program I think every one is interested in trying to figure out just what the program would call for, and a mere appropriation of $25,000,000 or something of that kind does not amount to anything, one way or the other, unless you know what is called for, and what it is for, really, and unless you have a plan.

Col. REYNOLDS. I have not studied that end of it. There are a great many things that the money can be used for to great advan-

tage, and a great many it is needed for. The exact cost of different things, etc., I have not had any opportunity to study.

Mr. FULLER. But you think landing fields at a distance of about 15 miles apart is about the right distance?

Col. REYNOLDS. I figure that purely on a mathematical basis. You figure that flying from 5,000 to 7,000 feet, which is about the height that a cross-country run would be done, the average ship can glide usually a mile to every thousand feet. Well, at 7,000 feet and with landing fields 15 miles apart, you could always get into a landing field. You would never be more than 7½ miles from a landing field. That is putting it down in figures according to mathematics. That is the determining factor. In that way, you would never have to land on a field that is not prepared for you.

Mr. FULLER. I should think it would be child's play, running an army or navy, compared to developing this program to its limits. I can see the importance of a unified control.

STATEMENT OF CAPT. BURDETT S. WRIGHT.

Mr. MORIN. Are you in the service at present?

Capt. WRIGHT. Yes, sir.

Mr. MORIN. Were you in the service previous to the war?

Capt. WRIGHT. No, sir.

Mr. MORIN. You entered the service since the war began?

Capt. WRIGHT. Yes, sir; I went in the Coast Artillery as a Coast Artillery officer, in the training camp.

Mr. MORIN. In the Aviation Service?

Capt. WRIGHT. No, sir; but was transferred in France to the Air Service as an observer.

Mr. MORIN. Have you seen service abroad?

Capt. WRIGHT. Yes, sir.

Mr. MORIN. How long?

Capt. WRIGHT. For 15 months.

Mr. MORIN. In what particular branch of the flying service?

Capt. WRIGHT. As aerial observer; I reported for aerial observation in April, 1918.

Mr. MORIN. From your own experience do you believe that you could have given better service and obtained better results under a united service under one supreme head?

Capt. WRIGHT. Yes, sir.

Mr. MORIN. Separate from the Army?

Capt. WRIGHT. Yes, sir.

Mr. MORIN. You can give us any views that you have, briefly, as to why you think it would be more profitable and of more advantage to the Government to have a united air service, with a director and one supreme command.

Capt. WRIGHT. Just at present we are having quite a problem in keeping the men that are in the service in all-around training, and the men must have all-around training. A pilot can not be a good pilot by taking a ship up four hours a month and flying around an airdrome. His flying during the month has to include a certain amount of cross-country work, a certain amount of training with other troops, with other Infantry on the ground, or Cavalry, or

training in patrol work along the coast; something to keep all the different incidentals of the Air Service and its tactical uses in his mind, and one of the things that Col. Randall spoke of was the patrol between Norfolk and New York, which is a new departure to train our personnel.

This is being done to give the pilots an opportunity to fly continuously for some distance, this distance being about 560 miles, and give the observer in the back seat at the same time practice in observation work.

In this connection there is now the post-office route between New York and Washington, which is not exactly parallel, deviating somewhat to the southwest, but it shows duplication of flying; that is, that plane in flying from New York to Norfolk could still carry the mail and at the same time give the pilot and the observer just as much experience. That is duplication, and it is impossible at the present time to switch your Air Service personnel from one branch of aviation to another branch of aviation and keep them in all-around training. That makes it very desirable to get all branches of the Air Service under one head.

Another thing is the number of Air Service officers. Say you have 1,200 in the Air Service of the Army. How many of those do you think you can keep as active flyers, even though they are ready and do the flying each month of four hours? Some of those have to be placed in executive positions, with the demand that a flyer sit at a desk in order to be able to handle the problems from a flyer's standpoint. This means he can not get out.

In Washington you have got three flying fields, which certainly shows duplication at the present time. You have got Anacostia Naval Station, Bolling Field for the Army, and College Park for the Air Service. Each of those branches has to have a man at the head of those fields who should be a flyer in order to conduct the operations from those fields with an intelligent viewpoint, and that means that there you are calling on three aviators from the United States that are going to have executive work at the fields and will not be able to keep themselves in good trim as flyers, because they will have too much responsibility, whereas if those were under one head you could take your Bolling Field, if you are going to use that site, have it abut the river, and have one commanding officer for the whole field. That one commanding officer would be able to handle all the work, as far as I can see, that is being carried on at these three fields.

So every day, in trying to figure out this training, and trying to figure on keeping the men as experienced as possible, we get thrown back at us the demand on our forces which keeps us from doing that, and there is a lack of opportunity for training. In regard to the mail service, the Army would be very glad to have an opportunity to give our pilots cross-country training.

Mr. MORIN. What particular advantage in time of war do you think it would be?

Capt. WRIGHT. I do not want to reflect on the training of our pilots in the back, but when the rush came in the summer of 1918, many pilots had to come up to the front with probably two or three cross-country flights. They had never had much instruction, and I know of several pilots that had to be led as you would lead a horse

back and forth to the front, simply because they had not had the proper experience in cross-country flying. If you take these civilian pilots that do cross-country flying and are able to pilot their machines as Army pilots in case of war, they will have that cross-country training.

It means that under one head you are going to be able to watch the activities of all flyers in the United States and that you will have the data covering the activities available. The Post Office Department can look over into the tactical department, the maneuvers with troops, and see what this man in doing over there, or a man in the tactical maneuvers with troops could look over into the Post Office Department and get a long-distance flyer if he wants him, whereas at present, if you try to get information from one department to another you strike a stone wall about two-thirds of the time.

Mr. MORIN. In time of war where would they operate to advantage independently of the Army or Navy?

Capt. WRIGHT. The only opportunity for absolutely independent operation would be, as has been brought out before, in the first contact. That is, immediately after war is declared, the country with the stronger air force will concentrate and will get into the other country immediately, because the Air Service is dependent upon its gasoline capacity, or the gasoline capacity of its ships. If they have sufficient gasoline to go 200 miles in and return, they can go 200 miles in and return, make the necessary observations, make the necessary bombardment, or meet the enemy in his own country for the resulting battle, but as soon as you have a front over which to fly, or a line of division between your friendly troops and the enemy troops, there has to be on the ground either the Navy or the Army, and consequently the Air Service would have to operate in connection with them.

Mr. MORIN. But do you not think it would be a great advantage when they are beyond the fighting area of the Army or Navy, such as bombing factories, manufacturing munitions, and things of that kind?

Capt. WRIGHT. Yes; the bombardment and strictly long-distance observation work is more nearly an independent function of the Air Service because of the fact that the information or destruction so far back in the enemy's territory is not in direct contact with the front of an army or division, but it is more against the enemy as an enemy, and those maneuvers would probably be directed under the chief of the Air Service covering the whole operation, whereas the Army front would have its operations under the direction of the Army commander, but the details as to the manner of operation should be under the Air Service.

STATEMENT OF MAJ. WILLIAM C. OCKER.

Mr. MORIN. You are in the service?

Maj. OCKER. I enlisted in June, 1898.

Mr. MORIN. Were you in the Regular Army?

Maj. OCKER. At that time; yes, sir. Now I am a temporary major and my service has been in the Cavalry about 12 years, and I have been in the Signal Corps, which was then a detachment of

the Signal Corps and is now the Air Service, since 1912, and I have been flying about six years.

Mr. MORIN. Did you enter the Army as a civilian, or a graduate from West Point?

Maj. OCKER. I came into the Army as an enlisted man, and was commissioned as a captain in the reserves before the war, and was made a temporary major in 1917.

Mr. MORIN. Did you enlist as a private?

Maj. OCKER. Yes, sir.

Mr. MORIN. You have been flying about six years?

Maj. OCKER. Yes, sir.

Mr. MORIN. You entered the service early, then?

Maj. OCKER. Yes, sir; there were very few machines in the Army at that time.

Mr. MORIN. During the war where was most of your service done?

Maj. OCKER. At one of our large schools in Louisiana, at Lake Charles, and later at Dayton, Ohio, testing the DH-4s.

Mr. MORIN. Were you abroad at all?

Maj. OCKER. No, sir; I got to the port of embarkation.

Mr. MORIN. Do you believe, from your experience, that it would be an advantage to the Government to have a united air service, under one supreme command?

Maj. OCKER. I do.

Mr. MORIN. Why; from what standpoint?

Maj. OCKER. It will avoid duplication, and at present the laws and regulations of the Army do not hold good for the Air Service. I do not think they are economical. As an illustration, I can show a concrete case of a man who is in the hospital and will be discharged for disability on account of a wound received abroad, and since he has been in this hospital he has flown from New York to San Francisco and back, but he can not march 20 or 30 miles, and the regulations or laws of the Army are that this man will be discharged, receiving a pension from the Government, when he could be used and would make an excellent squadron commander, and is a very good pilot. We have a number of cases of that kind.

In the air service they will have crashes as long as they are flying. That we know. If a man is slightly injured so that he has a crooked arm or a crooked leg, but can still go on with his work, why not keep him? That is one case.

Now, we have at Bolling Field two commanding officers, two power plants. The Army does not benefit by the work of the Navy and the Navy does not benefit by the work of the Army. The enlisted personnel of the Navy receive about $20 a month per man more than the enlisted men of the Army, which makes unfair competition on that one little field. In other words, the Navy gets the best mechanics. Since the armistice has been signed our good mechanics are getting out of the service. They are being replaced by inexperienced men, who will in time get training, but as it stands now, during the process of training of these enlisted men we are having considerable trouble with our motors and machines.

The work is highly technical and I believe the service should be made such that it will be attractive for a pretty good type of mechanic. The conditions should at least be as good as those of the

ordinary mechanic who is working in the garage. I have been flying across country for a year and a half or two years with DH-4s, and have gotten through from Washington to New York and other places with fewer crashes than most people just for the simple reason that I have devoted a lot of my time to the actual mechanical work, and would go to work on my own machine.

Mr. FULLER. In other words, you do not feel like trusting your life in the air to a repair man who overhauls the machine, under present conditions, or do you think conditions are improved?

Maj. OCKER. Yes, sir; I think so, because when it is all finally said and done, the pilot, I believe, who is better posted in regard to his machine is the one who lives longest.

Mr. MORIN. A man who can inspect his own machine before he takes the air?

Maj. OCKER. A man who can practically assemble it and do his own repairing.

Mr. MORIN. And understands the repairs needed?

Maj. OCKER. You have got to anticipate the repairs, because if things go wrong in the air it is too late, and then you come down with a crash and that is the end of you.

Mr. FULLER. How much are these men paid to do this work—these mechanics?

Maj. OCKER. The same as ordinary soldiers in the Signal Corps. To me, personally, one mechanic who understands his business is worth 20 men.

Mr. MORIN. And if you could pay better mechanics you could get along with fewer men?

Maj. OCKER. Yes, sir; and I think it would be economical for the Government. For instance, if we paid a mechanic, say $1,500 a year, he would work on the machine and keep it in the air. There, for instance, is an example. We have ordinary soldiers who are underpaid in comparison with the Navy. Now, if we have a mechanic who knows his business, who will prefer the Air Service to the garage on the outside, it is economical for the Government because he will save crashes.

I believe that I have broken up fewer machines for my time in the air than most of our pilots, for the simple reason that I have devoted very much of my time to the mechanical work. And then, if they would sort of consolidate or unite everything in connection with the air forces, or everything that flies, under one department, I would not care what it was called, I think it would be a benefit.

Mr. FULLER. We will agree, for example, that you would have to pay a man for this work in the neighborhood of $1,500 a year. What are they paid?

Maj. OCKER. The privates receive, I believe, $30 a month.

Mr. FULLER. Those are the men who overhaul the machines and get them ready for you to go up in?

Maj. OCKER. Yes, sir. There are promotions in the grades. We have the grades of private; corporal; sergeant; sergeant, first class; and signal electricians.

Mr. LAGUARDIA. He gets $100 a month?

Maj. OCKER. $87, I think.

If they paid the enlisted men enough to make the service attractive for mechanics, it would save crashes. We all crash sooner

or later. I do not know anyone in this work who has stayed in it constantly from the very beginning who is alive to-day who has not been crashed several times. We can eliminate very much of that by making the service attractive for very good mechanics. The work is highly technical, and to me it is of more importance than your emergency landing fields, or anything else.

When I get into the air I want my motor to run, and I will fly over rough country, tree tops, or anything else. That is what I am depending on, not so much on the emergency landing field, so I go to work on the machine before I start.

Since the armistice has been signed we have had crashes one after another. During the rush training of pilots during the war we have had more accidents than we will have in the future if they are trained carefully and slowly. For instance, during my time in California in charge of the flying there for about seven months there was not a man injured and not a drop of blood shed, but as soon as war started, and they started this hurried training, which they had to do, and which we will have to do in the future, then accidents began to happen. That is very expensive, and there will be accidents in the future as there have been in the past, unless you make preparations for your training in peace times.

Mr. LaGuardia. And a well-equipped training department to take care of emergencies with less loss of life?

Maj. Ocker. And the way I figure the loss of life is in this way, from a money standpoint, that every time you kill a pilot there is $10,000 war-risk insurance.

Mr. Morin. Do you believe that if we made the salary attractive, or so attractive that good mechanics would enter the service, we could get along with fewer men and reduce the number of personnel?

Maj. Ocker. The personnel has never been too much in the Air Service for the work to be done.

Mr. Morin. I would imagine that those men you get in the service for $30 a month would not do as much work as a good mechanic.

Maj. Ocker. Yes; we could get along with fewer men with higher pay than we ordinarily can.

Mr. Morin. It seems to me that a first-class mechanic will do more work than three or four of those men that work for $30 a month.

Mr. Fuller. You say the Navy paid their men more?

Maj. Ocker. The Navy paid the enlisted men $20 per month more, which makes unfair competition at Bolling Field. That is one of the things that would be avoided in a united Air Service. Then the necessity of keeping pilots in the air in peace time will avoid any future rush training, if we ever get into any trouble.

STATEMENT OF MAJ. CHRISTOPHER W. FORD.

Mr. LaGuardia. What is your name?

Maj. Ford. Christopher W. Ford.

Mr. LaGuardia. You are still in the Army?

Maj. Ford. Yes, sir.

Mr. LaGuardia. What is your assignment?

Maj. Ford. Liquidation division in Washington.

Mr. LaGuardia. How long have you been in the Army?

Maj. FORD. I was commissioned in the American Army on July 26, 1918. Before that I was with the French.

Mr. LAGUARDIA. Flying?

Maj. FORD. Yes, sir.

Mr. LAGUARDIA. You were with the Lafayette Escadrille?

Maj. FORD. Yes, sir.

Mr. MORIN. How long were you in the French service?

Maj. FORD. I joined on May 17, 1917.

Mr. LAGUARDIA. Have you heard the testimony of the fliers today?

Maj. FORD. Yes, sir.

Mr. LAGUARDIA. Do you agree with what they say?

Maj. FORD. Yes, sir; I am in accord with them.

Mr. LAGUARDIA. Do you believe we ought to have a separate, united air service?

Maj. FORD. There is no question in my mind about it.

Mr. LAGUARDIA. You heard the fliers this morning testify as to the necessity for an unrestricted field of action in doing pursuit work?

Maj. FORD. Yes, sir.

Mr. LAGUARDIA. That is absolutely necessary?

Maj. FORD. Yes, sir.

Mr. FULLER. Have you some statement in mind that you would like to make?

Maj. FORD. No.

Mr. MORIN. Just express your views in regard to a united air service.

Maj. FORD. I wish to say that I have read over both of the bills before Congress now, the new bill, the Curry bill, and also the bill for the reorganization of the Army. I have also read the testimony which was brought out in the Thompson investigation, and I have read the testimony of the American air commission which was headed by Assistant Secretary Crowell, which spent several weeks hearing the aeronautical experts of England, France, and Italy, and each one of those cases point to a united air service under a separate responsible head, and I can not see how any fair-minded man can really say anything against a united air service.

There is no question but that it eliminates duplication of expenditures, and will bring good results. In France during the war you had your English armies and your allies. They did not pull together, and what did they do? They went and got Field Martial Foch and put him at the head of it, and things began to go.

It was the same way with English aviation. The Royal Navy service was fighting with the royal air forces. They combined them and they got real results.

I think commercial aviation has got to be sponsored in this country because at this time we are undergoing a sort of after-war situation, and Congress does not approve at this time, or the general public does not approve at this time, big expenditures for military purposes, and for that reason I think it would be a good investment to put our money into the commercial end of aviation because it is undoubtedly a fact that in the war emergency we would be able to use the pilots and the equipment and use them for offensive or defensive purposes, whichever the case may b .

England, France, and most other European countries are going ahead fast in aviation. They have got trade commissions down in South America, and some of them over here in the United States trying to sell their airplanes and build up a big airplane industry, and they are looking forward.

We, on the other hand, have done nothing toward building up our aircraft industries at all. In fact, as Capt. Rickenbacker testified, we have only got 5 per cent of the men that we trained for the war at the present time willing to sacrifice their private interests to stay in the Army because it does not offer any future for them, and commercial industries, commercial houses, are afraid to branch out into the aviation game.

They realize the big possibilities that are there, but they do not know the policy which the War Department is going to pursue, and I remember reading an article which some Englishman wrote in defense of having a separate air service in England and building up a commercial aircraft industry, pointing out the needs for having landing fields and rules and regulations for driving.

Mr. FULLER. Who wrote the article, do you know?

Maj. FORD. No, I do not know, sir; but he said, "How much traffic do you suppose would be in the English Channel to-day if we did not have any buoys, lightships, lighthouses, harbors, and different means of marking, and charts, which is a question you are up against in aviation to-day.

You have got no rules or regulations on it, you have got no fields for landing, you have not anything to guide you, you have not got a descent map which we can fly with in this country, in comparison to the maps they have in France.

Mr. LAGUARDIA. The Germans had very good maps?

Maj. FORD. I have never seen one, sir; but I understand they had very good maps.

Mr. LAGUARDIA. At the front where we were stationed we used often maps, and they were very good maps.

Mr. MORIN. From your experience with the French Army previous to our going into the war, and your experience in the American Army after we entered the war, do you believe you could have given better results or obtained better results with a united Air Service under one supreme head?

Maj. FORD. I do, because they were sending us out as Maj. Biddle testified this morning to do missions that were impossible of accomplishment. We had a gasoline supply of approximately two hours, and they would ask us to escort a bombing expedition out, and we would start out, and by waiting for them to come up, without going too far into the enemy's lines, by the time they arrived we did not have enough gas to stay with them.

Mr. MORIN. Your gas would be exhausted before they would be ready to catch up to you?

Maj. FORD. Before the objective was reached.

There is one other point I would like to bring up. I understand you have asked questions along the line of how is it the Navy does not ask for a separate air service and the Army does. Well, you must realize that the Navy has taken the Liberty plane which was developed by the Army and they were not operating on as big a scale as the Army was, and they seem to have gotten practically

everything they asked for, and I do not believe that holds true with the Army. The naval military aviator draws 50 per cent flying pay. The majority of your Army aviators are drawing 25 per cent.

Of course there are ratings of junior aviator and military aviator who draw from 50 to 75 per cent, but those seem to be things that are pretty hard to get.

Mr. FULLER. The requirements of the Navy for an airplane are comparatively simple, are they not, as compared to the Army?

Maj. FORD. Just what do you mean by that?

Mr. FULLER. That they do not need as many different types of planes in the Navy as you do in the Army.

Maj. FORD. No, sir; because there are only two types of planes that you can operate. It is either a flying boat or a pontoon.

Mr. MORIN. Their duties are not as varied as those of the Army, are they?

Maj. FORD. I do not know that I could say that. We both do the same type of work, and I can not just explain why it is that they have concentrated on one or two types, but I think they have taken advantage of the mistakes that were made by the Army in picking out those types.

Mr. FULLER. There is no comparison between the two problems.

Mr. MORAN. Except when they are cooperating with land forces, but when it is purely a naval operation, I do not think there is. What he referred to is the fact that the Navy men do not want this separate. It is a task that the Navy is up against. It is the Army in this problem.

Maj. FORD. Here is another situation. Suppose you want to bomb a place which could be reached probably better by a naval base than an Army base, yet they would be sending a squadron over land probably 100 miles. All right, the Navy would probably say, "that is our job," and the Army would come along and say, "No, that is our job." Well, if you have got a separate, united air service you will have a man at the head of it who will say, "You will do it."

Mr. MORIN. At what point do you think they ought to act independently in time of war?

Maj. FORD. It has been brought out in the testimony this morning——

Mr. MORIN. When you get beyond the range of their guns, where their active operations are, then they ought to act independently?

Maj. FORD. Exactly.

Mr. LAGUARDIA. That brings out the point that a good many are laboring under the misapprehension that aviation is only defensive. It is very largely offensive, because we go away beyond the range of the artillery.

STATEMENT OF LIEUT. CHARLES H. DOLAN.

Mr. LAGUARDIA. Lieutenant, are you still in the Army?

Lieut. DOLAN. Yes, sir.

Mr. LAGUARDIA. What assignment of duty?

Lieut. DOLAN. I am in the Information Group, office of the Director of Air Service.

Mr. LAGUARDIA. Where stationed?

Lieut. DOLAN. Here in Washington.

Mr. LAGUARDIA. How long have you been in the Army?

Lieut. DOLAN. My American commission dates from November 7, 1917.

Mr. LAGUARDIA. Were you in the Lafayette Escadrille?

Lieut. DOLAN. I was in the French Army for two years and worked in the aircraft factories a year before that.

Mr. LAGUARDIA. What are your views on this question of a separate air service?

Lieut. DOLAN. I am very much in favor of it. In fact, in my estimation, it is the only solution. At the present time, there are four different people playing with the same thing; and if it continues as such, you will have the Department of the Interior wanting some airplanes to do some of their work; you will have the Bureau of Fisheries wanting them to spot schools of fish; you will have the Coast Guard with balloon companies; and there will be an air service all over the country, everybody having a finger in the pie.

Mr. LAGUARDIA. That is a condition now the Post Office already has.

Lieut. DOLAN. Only it will be just twice as bad, and everybody will have an independent organization which, in expense of administration and operation and of training and of supply will be a duplication.

Furthermore, I think that if we had a separate air service, which is bound to come, and while we are making the step in that direction we might as well take a full step and not half a step and have a Cabinet minister and put the whole shooting match under one head, and require a pilot, in order to secure a military pilot license, to be able to fly on land or water and in every kind of airplane that is built, a dirigible balloon, a free balloon, or anything else. That, in my judgment would qualify a man to be a military aviator, and then they can specialize in their own particular line, and in case of war they can detail certain men to different sections of work.

Now, an instance of where there was very poor management was the Postal Service, which was inaugurated during the war, when every man and every airplane was needed for the Army, and drained some of our resources. The Navy was probably operating generally around Pensacola and around Key West, when they ought to have been concentrated. If they were under a director of air service, he would say, "Put all available stuff in such and such a place," and just leave a skeleton organization behind them, and would have concentrated all airplanes, especially up in the Dunkirk sector, where we had the Army, the Navy, and the air service all working together.

I was present at the time and was sitting up on a sand dune watching the English put the *Vindictive* in Ostend Harbor, and the navy had the cooperation of the army, and the army cooperated in the maneuver inasmuch as they concentrated all their artillery and everything toward that point.

The Handley-Paige night bombers were going over, bombing the place, and the airplanes from the British coast were bombing it, and the battleships were doing the attacking and putting the ship in there. Now, in my estimation, in a case like that your Air Service

should be absolutely as independent of the Army and the Navy as it is from a bird. Their ideas and ideals are just as far separated as anything on the land and in the air. There are three elements—three distinct services—and they have not anything in common, except when they are all working together. Furthermore, if I had my way, I would reorganize the whole thing. I would not call the War Department the War Department; I would call it the Army Department; and the air and water should come under the War Department, and those officers should not only be West Point and Annapolis graduates, but graduates of an aeronautical college. At the present time where are you going to get your aeronautical engineers? They have all left the service. We can not keep them in as lieutenants. I have no intention of staying in the service; there is no future for me.

Mr. LaGuardia. You say you were engaged in an aeronautical factory before you entered the French Army?

Lieut. Dolan. Yes, sir.

Mr. LaGuardia. Where is that?

Lieut. Dolan. In England I worked on British and French planes, and while there I became acquainted with American fellows in the American service, who numbered about 20 then, and I joined the French Army.

Mr. LaGuardia. Are you doing technical work now?

Lieut. Dolan. Yes; I am commenting on the reports from the aero attachés in foreign countries, and trying to collect information required and send it out for comment and return to the people who ask for it, and at the same time get the necessary documents and data from the British, French, and Italians, and collect a sensible aeronautical library and have it concentrated. It has been scattered all through the Air Service during the war. I want to get an aeronautical library, if it is to be had, if my hopes ever come true, or I do not get out of the Air Service before it happens, second to none.

There is no reason why we should not have the best aeronautical library in the world, as we have sources open to us which should put it in our way to secure that information.

Mr. LaGuardia. How does it happen that you have not obtained promotion?

Lieut. Dolan. I was recommended eight times in the last two months. I just seem to be on the wrong end, that is all.

Mr. LaGuardia. Is there anything else?

Lieut. Dolan. Furthermore regard to the Air Service operating independently of the Army and Navy, I will say that while I was in the French Army—and for your information, before I go any further—I will say that the French Army consisted of armies. There were some 20 French armies, roughly on the front. Each had its air service. We belonged to what they called the groupe de combat, and then they had the group for bombardment, and then the group of groups, which are absolutelv independent of any army commander.

In the battle of Verdun in this sector they moved up there overnight, and we would go over the line and clear the air and keep it clear while the infantry advanced. In the same way they concentrated all their bombardment in that sector. In the meantime, all

your artillery which is detailed with the Army is doing the work of bombardment. There are generals in command of each army, and they have not anything to say, but the air service general on Foch's staff is the man who moves these big units of airplanes around, and he can move 500 planes as if they were one, under one command. When I started they were flying one machine at a time.

Mr. LaGuardia. So the French have actually developed a practically united air service, have they not?

Lieut. Dolan. Yes, sir.

Mr. LaGuardia. And it is working well?

Lieut. Dolan. In my estimation it is as good as there is, but it can stand a lot of improvement, and inasmuch as we are taking the step in the right direction, why not take a full step and not come up to their level, but go on ahead of them?

England, after five years of exhaustive war, has considered it of enough value and has learned the lesson so well which has been driven home to them, that although their boast always was that they were an island empire and free from attack, and the navy was supreme, they are expending as much for their air service this coming year as they are for their grand fleet, and everybody knows what they think of their grand fleet.

Mr. Morin. What is that decoration on your shoulder there?

Lieut. Dolan. This shoe string?

Mr. Morin. Yes; what do they call it?

Lieut. Dolan. That is the croix de guerre. That is the squadron decoration of the members of the LaFayette Escadrille. Only seven of the old outfit worked through that citation.

Mr. Morin. How many were in the organization when you first went there?

Lieut. Dolan. Some 39. Maj. Ford got in just after we left Verdun, or he would be entitled to it, too.

Mr. Morin. Only seven survived?

Lieut. Dolan. Seven of the older outfit, that really lasted through it. I was in eight major battles in the French Army and two in the American.

Mr. Morin. Lieutenant, with your experience in England previous to entering the French Army, and your experience in the French Army and also in the United States Army, do you believe that you could have given better service and obtained greater results with a united air service under supreme command?

Lieut. Dolan. Absolutely. It is essential. At the present time there is nobody can say or do anything in aeronautics without colliding with the Marine Corps, the Army, the Navy, and the national advisory committee on aeronautics, and everything else, and our reports come to me from our attaché in Paris on certain developments, and one month later the national advisory committee on aeronautics sends the same report too to us.

I was investigating officer after my return from France, and on going through the fields in Florida I had occasion to visit Miami, where there was a landing naval station, a marine flight station, and an Army station, and I did not see there was any reason whatsoever why they could not all be operating under one commanding officer.

The same condition applies right here in Washington, with Bolling field, the Navy field, and the post-office field out at College Park.

Another thing, in flying over the Everglades, I find that that country is not mapped right. I have followed these maps practically every year, and I think the fellow that drew them must have been sitting in Jacksonville, from my actual experience. The pilot has got to go by the map, and his map has got to be true.

STATEMENT OF MR. FRED TILLMAN.

Mr. LaGuardia. You reside in Washington at the present time?

Mr. Tillman. Yes, sir.

Mr. LaGuarda. You were in the Air Service during the war?

Mr. Tillman. I was.

Mr. LaGuardia. How long were you in the Air Service?

Mr. Tillman. From December, 1917. I came back here in 1919, February.

Mr. LaGuardia. You saw action?

Mr. Tillman. Nine months on the front; yes.

Mr. LaGuardia. You were awarded the D. S. C.?

Mr. Tillman. Yes.

Mr. LaGuardia. The Legion of Honor?

Mr. Tillman. Yes.

Mr. LaGuardia. The croix de guerre?

Mr. Tillman. Yes, sir.

Mr. LaGuardia. From your experience, Lieutenant, do you believe we would develop aviation and create a proper kind of Air Service in this country by a separate air service and take any jurisdiction over all aerial activities of the country?

Mr. Tillman. I think it is the only possible way to do it. I think it is not only expedient, but I think it is absolutely necessary.

Mr. LaGuardia. And you also believe that we ought to have the men who know the air in command?

Mr. Tillman. Absolutely. The Air Service now is not and never has been in the hands of its friends. I will not say it is in the hands of enemies, but they are not its friends.

Mr. LaGuardia. They are not sympathetic?

Mr. Tillman. They are not sympathetic and they do not understand it. They are not only grossly ignorant about it, but they are prejudiced against it. I was operating officer for a while for my squadron, and in the middle of the night I have been called up on the telephone by the commanding general of the division to send out a plane at that time of night and drive off the enemy airplanes that were bombing, and we an observation group.

A number of instances like that show simply that the Regular Army and the General Staff and the men generally in charge of things could not understand or appreciate the Air Service.

I did not accept a commission in the Reserve Corps for various reasons, and I would not have any of any kind now, for the reason that the thing is in a very chaotic and unsettled state.

I think the Chief of the Air Service at the present time is not an Air Service officer. He should be. If I understand correctly, he is a Field Artillery man, Gen. Manoher.

Mr. LaGuardia. A general soldier and all that——

Mr. Tillman. Everything, but absolutely ignorant of the Air Service except what he has gathered since he has been Chief of the Air

Service. The Air Service ought to be a separate department. There is not any question about it. The man in charge of the Air Service ought to be an Air Service man and a flyer. I can not see how any intelligent man except one acting for self-interest can testify that we should not have a separate Air Service, and I certainly do not fall in with the argument advanced by the General Staff and by certain Army and Navy officers who say it is not expedient and can not be done.

I do not know that I have anything particular to offer to the committee, but I would be glad to answer any questions.

Mr. MORIN. Would you have remained in the service if it had been properly united and organized under a separate department?

Mr. TILLMAN. You say would I?

Mr. MORIN. Yes.

Mr. TILLMAN. I would not remain in the service. If I had been tendered a commission that I thought was commensurate with my service, I probably would have remained in the Reserve Corps, but I would not have gone into the Regular Army under any consideration.

Mr. LAGUARDIA. What commission did they offer you?

Mr. TILLMAN. A first lieutenancy.

Mr. LAGUARDIA. For all your experience at the front?

Mr. TILLMAN. Yes, sir.

Mr. LAGUARDIA. There were a great many men who were tagging boxes in this city who were majors and colonels?

Mr. TILLMAN. Yes; quite a good many. They had a wealth of material over here who were majors, lieutenants, and colonels.

Mr. MORIN. Were there any flyers who would have remained in the Army if we had had a proper organization?

Mr. TILLMAN. Any number of them. You could build up a splendid air service with dispatch from the present force of trained flyers and trained men, but by reason of what they have done, and then also by not having a definite and fixed and certain plan to work to and a separate air service to begin with, these men have left the service.

Mr. MORIN. Many of those men who would have not remained in the Army if they had had a proper organization are some of our best flyers and most experienced men, are they not?

Mr. TILLMAN. Men who would have been most valuable to the service and would have been very glad indeed to have remained in it.

Mr. MORIN. And would have formed a nucleus around which to build a wonderful department?

Mr. TILLMAN. Yes, sir; which will be absolutely necessary in the event of war.

I am interested in commercial aviation like every other citizen, but remember that we have got to have an aviation department and an aviation force to guard against a possible war also. For instance, take the situation in Mexico now. They say that Mexico, with 22 airplanes, has a more superior air force than we have. Whether that is true or not, I do not know. That is the report, anyway. I know that we spent $640,000,000, and 640 of us got to the front, making each of us cost $1,000,000. I am not worth that much myself.

Mr. LAGUARDIA. You belong to our congressional family, do you not?

Mr. TILLMAN. Yes; my father is in Congress.
Mr. LAGUARDIA. This is Congressman Tillman's son.
(Whereupon the subcommittee adjourned.)

STATEMENT OF MR. GEORGE H. HOUSTON, PRESIDENT WRIGHT-MARTIN AIRCRAFT CORPORATION, NEW BRUNSWICK, N. J.

Mr. LAGUARDIA. Mr. Houston, you represent the Wright-Martin Aircraft Corporation?
Mr. HOUSTON. Yes.
Mr. LAGUARDIA. What is your address?
Mr. HOUSTON. 40 Wall Street, New York City.
Mr. LAGUARDIA. Your company has factories, has it?
Mr. HOUSTON. Our company at the present time has disposed of all of its war-time manufacturing facilities, but it is now planning to build a new factory on a much smaller scale for the manufacture of aeronautical motors. The Wright-Martin Co. has confined itself strictly to the manufacture of aeronautical motors, with the exception of its ownership of the Wright patents, and its ownership for a short time of the Glenn L. Martin Co., of California.
Mr. LAGUARDIA. When do the Wright patents expire?
Mr. HOUSTON. The most important of the Wright patents, the basic patents for warping the wings, expires, as I remember, in May, 1923.
Mr. LAGUARDIA. How long have you been in the aeronautical industry?
Mr. HOUSTON. Since the middle of 1916.
Mr. LAGUARDIA. Can you give us suggestions along the lines that have been testified about this morning?
Mr. HOUSTON. I have listened to the testimony this morning with considerable interest, and I would answer the first question you have put to the various gentlemen as to whether I believe a united air service was desirable, in this way.

I believe aviation, or air flight, is of great permanent importance as a medium of national defense and as a factor in the economic life of the world in a relatively new field. It is the fastest means of transportation that man has ever devised, and the economic history of modern civilization has shown that improved transportation is always of tremendous importance in the development of civilized activities.

I believe air flight will be developed effectively in America more rapidly by a unity of governmental activities, with the exception of the operations in the Army and Navy Departments, into one central department than by any other means, for the following reasons:

Due to the intricate and highly technical nature of almost all phases of air flight it is very difficult to train to advantage a number of Government departments, with all the red tape and restrictions that are of necessity thrown around their activities, to independently handle this subject. We now have the Army, the Navy, the Post Office, and the Interior Departments developing air flight bureaus and undertaking to solve simultaneously many problems which could be better solved if this intelligence was concentrated into one well-developed central department. This, as I stated earlier, should exclude the operations of the Army and Navy in regard to aeronautical equipment, in that aeronautical equipment in the Army and Navy is of necessity an adjunct, as artillery or cavalry or motor transport,

to the fighting machine as a whole, and as an adjunct should be made subordinate to the commander of the particular unit of the Army or Navy that is in action.

In the judgment of many of the best military authorities in Europe, with whom we came in contact on the recent visit of the American aviation mission, of which I was a member, it is expected that future fighting will develop the use of an air army as an independent unit, just as separate from the land army of to-day as the water navy is.

It is also recognized, however, that it is more difficult to coordinate three separate methods of offense or defense than it is two. It is also recognized that in the past the army and navy of various nations have not always effectively coordinated.

During our visit we received several expressions of opinion to the effect that if air fighting developed into a separate branch of military science that a supreme commander would ultimately have to be developed to supervise all three departments, at least in time of active service.

It is generally conceded in Europe that if such an independent fighting air force is developed it should be a part of this united air service.

Going back to the other reasons for the united air service, I would say, second is the matter of production. At the present time production has been attempted by governmental departments, but without marked success as to economy or speed. The greater part of production, however, has been carried on by private industry, and, in my opinion, the development of aircraft production by private industry in the future is the one solution for the effective and economical supply of aircraft that may be needed.

This private industry at the present time is working with three different departments of the Government, with three different methods of contracting and three different methods of inspection, and, in general, three different sets of contractual relation, which adds very greatly to the complexity of the relations of such private plant.

If the Army, the Navy, the Post Office Department, and the Interior Department and other departments requiring aircraft were required to obtain their supplies through a central production bureau I am firmly convinced that marked economy would result, first, in administration of such procurement activities; second, in lowering prices from contractors, due to the more economical operation of their own activities.

The third phase of benefit that would result from such a united service is in the technical development of aircraft in general. I am a strong believer in such a central department having a thoroughly effcient technical staff to confer with the Army, the Navy, and other departments of the Government in determining their requirements, to take the general specifications, resulting from such determination and develop them still further into sufficiently tangible specifications to offer to private contractors for their study and development into actual airplanes, balloons, motors, etc.

Such a department, I believe, should carefully supervise the development of such experimental craft by private contractors, and when fininished, should test out and experiment with such product in a

very exhaustive manner, and after completing such experimentation should formulate and submit their recommendations to the production department for the procurement of the craft desired.

Such a technical department would act as a judge and critic and to be most effective should be entirely impartial. It has been my experience that if such a technical department undertakes the development of any unit of craft upon its own account it loses its impartiality, at least in the mind of the private contractor, and it is either consciously or unconsciously always tending to favor the craft developed in its own department rather than determining upon the effectiveness of a given design strictly upon its merits.

This was the experience in England in the development of its technical activities, and so much friction was created that the English department, I understand, had to finally give up all activities in the direct development of new designs other than those of judge and critic and the encouragement of private initiative.

Mr. LaGuardia. Is that recently?

Mr. Houston. This was made before the termination of hostilities, so I am told.

The fourth phase of benefits that would result from a united service is in the operation of the craft itself. Air flight is essentially an international activity in that the speeds and distances covered are so great that any flight of great distance is very liable to cross international borders. This has been recognized to such an extent in Europe that an international convention was called together during the peace negotiations and an international agreement was arrived at setting forth the fundamental principles that should be embodied in an international understanding or treaty that would govern the international control of air flights.

Mr. Olney. Did the United States take part in that?

Mr. Houston. The United States took part in this convention by a representative of the Army and of the Navy. No civilians or practical aircraft authorities were represented during the negotiations.

One of the representatives of the English group was the president of the English aeronautical industrial association and one of the best informed aeronautical authorities in England. The American aviation mission was asked by the Secretary of State to pass upon the provisions of this international convention, and they in turn submitted this convention to the Manufacturers' Aircraft Association for their consideration and study.

They made a thorough study of the terms of the convention and reported in turn to the aviation mission which, upon proper consideration, formulated its report to the Secretary of State. In general, both the aviation mission and the Manufacturers' Aircraft Association approved of the basic provisions of this convention, although they did not entirely agree with some of the detail provisions embodied in the annex.

The next step in the development of the operation of craft must, in my opinion, be the formulation of a body of law to govern the flight of aircraft within the Nation itself.

Reference was made a few moments ago to the development of the automobile industry in this country. Anyone who has been inti-

mately connected with the industry will know it has been affected tremendously, due to the failure of the Federal Government to establish licensing control of the use of automobiles in the early days. As a result, each State has formulated its own regulations and we know of the many difficulties involved, including in the District of Columbia the necessity for carrying two or three, or sometimes four, license plates. We want to avoid this difficulty, if possible, in the development of aircraft, and to this end an adequate body of Federal law should be prepared.

Again, no greater benefit can accrue to the industry than the formulation within this body of law of rules and regulations governing the uses and construction of aircraft that will prevent putting into the air improperly and dangerously designed craft, or the reckless and ignorant operation of craft in the air which will cause accidents and loss of life and property. I would like to refer, if the chairman will permit, to certain specific recommendations, which, as chairman of the commercial subcommittee of the American aviation mission, I prepared carefully in making up their report.

Mr. LaGuardia. That complete report is in our record.

Mr. Houston. I would like to refer to the importance of certain phases of the activity that should be developed by a united air service.

The civil aviation division of the national air service should establish, with the advice of the Army and Navy and the Division of Military and Naval Aeronautics, a series of flying routes throughout the United States and its possessions and to contiguous foreign countries, which will be of military and commercial value. It should also prepare and publish maps and descriptions of each of these routes, suitable for the use of fliers.

There should be provided at national expense certain flying fields in strategic locations, and suitable for military purposes, and encouragement should be given to the various States and municipalities to provide flying fields upon all flying routes, at points found desirable, thus eliminating the necessity for private ownership of flying fields except for strictly private use. Hangars should be provided at each flying field by the governmental authority owning the field—that is, Federal, State, or municipal—or where such fields are used constantly by private interests they should be permitted to provide their own hangars immediately adjacent to and opening upon such flying fields.

The operation and use of such flying fields should be controlled by Federal law, so as to obtain uniformity throughout the Nation and conformity with international regulations.

Upon that point I would like to refer to Mr. Hull's statement to the effect that the Government never has given any encouragement to the development of the automobile industry. The Government for 100 years has developed roads in this country upon which automobiles are used, and it is to-day appropriating through Federal, State, and local mediums hundreds of millions of dollars for road construction and maintenance. I want to say if the airship of to-day had its roadbed—namely, its flying fields, as well established and as well marked as the American roads are, the industry would not need any Government subsidy.

All flying routes and flying fields should be equipped at national expense with signaling and communication systems, including wireless telegraphy, wireless telephony, and searchlights, to thoroughly safeguard and guide aircraft in flight. The Government's attitude in this matter should be the same as that maintained toward shipping in its lighthouse and coast control service. The operation of signaling and communication equipment should be controlled by Federal law for the reasons already indicated.

A meteorological service should be developed to provide flyers and other aviation interests with accurate weather reports and other atmospheric data necessary to govern their activities intelligently. The value of this service to commercial aviation can not be overestimated as it will go far toward establishing reliability and safety of service, just as weather reports are of immeasurable value to ocean and lake transportation.

Training facilities should be provided at various localities throughout the country, either at Government expense, or by private enterprise under Government regulation, with guaranties from the Government of a sufficient number of students to cover expenses. Such guaranties could be given by the Government without undue expense if it used such school for the preliminary training of its military personnel. Such a plan would encourage private enterprise to provide facilities for the training of the personnel needed for commercial requirements, which personnel in turn should become a permanent reserve for military requirements in time of peace. There should be established at least one school for the teaching of aero dynamics and other branches of the science of aeronautics, as heretofore recommended. Encouragement should be offered to universities throughout the country to establish departments of aeronautical science.

The Government should encourage the development of new design and aeronautical technique for commercial purposes along the lines recommended.

The department of aeronautics should maintain the closest relations with all civilized nations in determining and applying the rules and regulations which will govern the international use of aircraft, and there should be developed, as rapidly as is consistent with proper consideration, a body of Federal law governing the use and airworthiness of aircraft for commercial purposes which will safeguard life and property, and promote the commercial usage of aerial transportation. In order that commercial aviation may be helped and not hindered by such legal restrictions, it is of vital importance that aerial transportation be recognized at once as an element of interstate commerce and be made subject to one body of Federal law applying uniformly throughout all of the United States. It will thereby avoid complications of individual State control which have proven to be such a handicap to railroad and automobile operations.

Insurance of aircraft and its personnel against all kinds of hazards and risks involved should be encouraged in every way. The cost of such insurance should be kept as low as is consistent with the risks involved.

Encouragement should be given to the organization of private enterprises for carrying on aerial transportation. This encouragement might well be in the form of payment for the carrying of mail and

expressage, and of guaranties as to the volume of such business. Compensation might be paid to such enterprises for keeping their facilities available for use in time of war. Guaranties of this kind, coupled with opportunity to insure against loss by accident, should made privately-operated transportation lines a commercial possibility, but if it is found that private enterprise does not respond to such encouragement, then the Government should undertake certain transportation ventures on its own account and should continue to operate such lines until they are proven commercially successful. Ultimately they should be sold to private enterprises on such terms as would permit of successful operation, as it is not believed that commercial aviation will ever be successfully developed entirely under Government control.

The remaining aircraft-production industry should be conserved and kept in a healthy condition by a well-defined continuing program of production for military purposes, over a period of years. This policy should be continued until the commercial demand is adequate to support an industry of sufficient proportions to form an effective nucleus upon which can be built a wartime production in case of need.

Those are some of the benefits I believe would accrue from a united air service, and those are some of the obligations I believe the Government should undertake through a united air service to develop this industry.

You have asked a number of times why the industry should be developed. I would like to answer that question in this way. As stated earlier, the history of civilization points to improvement in transportation as one of the great factors in its development. Whenever marked improvement in transportation has occurred it has been followed by a marked improvement in the Nation's condition. When in England I talked very earnestly with two of the industrial leaders of Great Britain on the subject of aerial transportation, Sir Samuel Waring and Sir Percy Herouard, the latter of whom is the managing director of the Armstrong-Whitworth Co. Sir Samuel Waring has some very large interests in his own name. Both of them expressed the idea that the time had come when a trans-Atlantic airship line should be started, and they stated in their own opinion within five years it could be made self-supporting, and it would reduce the time of mail from London to New York City two or three days.

Sir Percy Herouard told me when the R-34 was on the water that Lloyd's would insure its safe arrival at New York at about the same rate it would insure the arrival of any ocean-going steamship upon its maiden voyage. A service of this kind would immediately tend to relieve the pressure upon the trans-Atlantic shipping for the development of excess in speed. There would not be any doubt that it would pay to have this trans-Atlantic service for the shipment of mail, and occasionally a few passengers could be transported across the Atlantic in from two to three days. In such an event a five-day mail service from London to San Francisco and Vancouver would be a practical possibility.

Private enterprise can not undertake such large adventures as this at this time and will not be able to undertake them for many years. With a small amount of Government support along the lines of the

suggestions indicated, these ventures could be started at once, and within five years, in the judgment of men who have thought about the matter considerably, they would probably be self-supporting to an extent that would permit of their being operated entirely by private enterprise.

This would mean an immediate and fairly rapid development of the private use of aircraft for innumerable purposes of high-speed transportation. Such a development would, in addition to the economic benefit to the country, create a great reserve of aeronautical resources in the event of war.

I have been told that commercial aircraft is of very little value for war-time purposes, but I think persons who make a statement of that kind have not considered the problems involved sufficiently. The experience of the United States during the past war proved that the cost of the aircraft itself was a very small part of the total cost of developing military aeronautics. There must first be the technical personnel capable of conceiving and designing airships.

I think we will all agree that such a technical personnel, in close association with and under the direction of the military and naval authorities, could quickly develop the craft necessary for war-time uses.

Then comes the production industry with its organization, plant facilities, its resources of raw material, and its knowledge of fabrication and assembly. I do not believe anyone would dispute for a moment the availability of such resources for the use of war-time craft when needed. In fact, during the past war the greatest resource this country had for aeronautical motors was the automobile industry, and yet the automobile motor was a long way from the aeronautical motor, which I would illustrate in this way. The automobile motor cost before the war in the neighborhood of 50 cents a pound. During the war I was responsible for the making of several thousand Hispano-Suiza aeronautical motors for France and the United States, and they cost nearly $10 a pound. The relative refinement is almost inconceivable.

Next after the aeronautical production industry is the great mass of equipment and personnel making up the flying field and communicating mediums which would certainly be available for the training of military flyers in time of need, and to form a nucleus for our requirements.

And last, and I might say almost least, the aircraft itself and the immediate flyers. I thing everyone will agree at once that a man trained to commercial flights could be much more quickly trained to military operations than the man who never undertook flying at all. A commercial craft, if carefully developed, with military usage in mind and the design of such commercial craft constantly modified slightly to make military usage possible, such commercial craft would in the time of need be almost 100 per cent available for military usage of some kind.

The French Government recognizes this to such an extent that they are making their mail-carrying planes with a pouch compartment of such proportions and located in such a position as to be entirely available for the carrying of bombs.

So that in conclusion I would say that the cheapest way in which the Government can possibly develop its aeronautical resources for

purposes of national defense is by developing a great commercial industry to form a background for the relatively small military and naval aeronautical activities that it can afford to carry on in time of peace.

Mr. HULL. Have you examined the bills pending before Congress on this subject?

Mr. HOUSTON. Not in detail, Mr. Hull. I have read a couple of them, but hastily, some weeks ago, and I really do not remember their content definitely enough to talk about them.

Mr. HULL. Does your idea contemplate the creation of a new department with a Cabinet officer at the head of it?

Mr. HOUSTON. My idea would be the creation of a separate executive department. As to whether its head should be a Cabinet member or not, I, as a private citizen, do not feel qualified to express an opinion about. Personally, I consider the President already overburdened with too much Cabinet.

Mr. HULL. You heard me express my idea in regard to the manner of how far we should go. Do you think that is as far as we can go, or should we go further?

Mr. HOUSTON. I would say we should go slowly, and we should not take any steps in the development of this matter that have not been given careful consideration.

Your plan is, in my opinion, a step in the right direction. If, after mature consideration, there is not a practically unanimous conclusion as to the specific plan of operation, then I should suggest that a general plan would be the best thing to devise.

Mr. HULL. My plan would contemplate the creation of a department that could carry out your idea of having a national licensing system, national routes, and things of that kind. That can easily be done. That we all agree upon.

We all agree practically that it should include everything up to the training. When you get to the training then you find a vast difference of opinion.

The War Department itself does not agree—that is, there is a disagreement about that among the officials of the War Department. Mr. Crowell believes you ought to train the men partially, at least, so far as the primary training is concerned, and Mr. Secretary Baker does not. We find some disagreement all along the line. The Navy does not think the personnel can be handled at all as a separate department. It might be that such a department could work out a system, but I do not know about that. You are rather enthusiastic, I should say, in regard to the commercial use of the airplane. Is that not true?

Mr. HOUSTON. The officers of our corporation do believe enough in the future of air flight to have set aside several million dollars as capital with which to continue in the aeronautical industry.

During the war we had in the industry considerably over $10,000,000 capital. We propose to set aside in the industry now enough to determine its development. I can not say that we are unduly optimistic as to the immediate future.

Personally, I am of the opinion that its immedate future is about 100 per cent up to the Government. I am a firm believer in the ultimate use of aircraft as a means of human transportation and the

ransportation of light freight, such as mail and valuable express. I think it is as sure to come as the transcontinental railway system in a country like America.

Mr. HULL. I am somewhat of an enthusiast myself, but I do not understand some of the things about it. Why is it that there are so few men who care to fly a second time, or to repeat?

Mr. HOUSTON. I am personally of the opinion that much of our aeronautic design is upon entirely too empirical a basis; that we are not using the information and knowledge we have to best advantage. I think many planes put into the air are essentially unsafe, just as many ships would be put into the ocean which would be essentially unsafe if it were not for Federal regulations governing the construction and use of such craft, and that is why I believe it is so essential that the Government quickly formulate proper regulations governing the construction and operation of aircraft. I think such regulations will go further to establish confidence as to the safety of aircraft in the minds of the public than any other one thing that can be done, and I think the lack of such regulations does more to destroy that confidence than all other conditions put together.

Mr. HULL. Do you think it is unsafe to fly when you have a good lay, a good pilot, with a Government machine that has been inpected, with all conditions favorable?

Mr. HOUSTON. Given reasonable weather and a good machine with fairly experienced flier over country properly equipped with landng fields or over water, in the event of using a water machine, I do ot consider air flight any more dangerous than reasonably highpeed automobile travel over the ordinary roads.

Mr. HULL. I quite agree with you.

Mr. LAGUARDIA. Assuming that nothing goes wrong.

Mr. HOUSTON. I am making no unusual assumptions.

Mr. HULL. Even with those conditions, that are apparent to any hinking man, so far as men who have flown are concerned, there re very few of them who want to fly twice unless they go up as a porting proposition. That is true, I think.

Mr. HOUSTON. My own experience in making a few flights is that here are no unusual sensations without stunting, and that flying, fter a short time, becomes rather boring. I do not look for any reat development in the use of aircraft for sporting purposes, but am looking at it from the point of view of the satisfaction of a real conomic demand.

Mr. HULL. I think perhaps that women get into the commercial ircraft game and get caught in an accident sometimes because omen never hesitate; they will repeat, but men do not.

TATEMENT OF MR. F. L. MORSE, PRESIDENT OF THE THOMAS MORSE AIRCRAFT CORPORATION, ITHACA, N. Y.

Mr. LAGUARDIA. What is your full name?

Mr. MORSE. F. L. Morse.

Mr. LAGUARDIA. And your address?

Mr. MORSE. Ithaca, N. Y.

Mr. LAGUARDIA. You are the designer of the Morse scout?

Mr. MORSE. No; I am not a designer but simply a production man. I am president of the Thomas Morse Aircraft Corporation, which is a subsidiary, and all of whose stock is owned by the Morse Chain Co.

Mr. LAGUARDIA. Is your factory producing now?

Mr. MORSE. Yes; it is producing some experimental planes.

Mr. LAGUARDIA. So you have your organization, at least?

Mr. MORSE. Yes; we have an organization and more or less active production.

Mr. LAGUARDIA. Do you care to make a statement in reference to this matter of the formation of a separate air service?

Mr. MORSE. I have listened to the testimony given here and it has all been highly technical, and as a production man I have looked at it from a different viewpoint.

A central producing bureau is what I hope to see. I do not care what they do with the planes after they get them. I think they should be requisitioned by the different departments of the Government—the Navy, the Army, the Postal Service, the Patrol Service, or whatever the service may be. I feel that it is desirable to have a central head or a purchasing department, just the same as you have in any manufacturing plant. It is something like this: Each manufacturing plant wants to buy various kinds of nuts. That is a very common thing, and if that were done there would be various threads, but they would hardly have half a dozen different purchasing bureaus to purchase those things. The functions throughout are practically the same in all machines, and to a very large extent the functions of flying machines are somewhat similar.

If there was a central purchasing bureau which was competent they would see that the kinds of planes were so made that they would be more or less useful in different functions, the Army and the Navy, patrol work, etc., or at least so far as that might be possible, and in that way it would make a marked saving to the Government.

In the technical design of the plane very largely, I think, one thing is always present. It is the possibility of keeping up in the air. After that come certain definite functions, high speed and low speed, etc., and so, if they had some supervision, they would know whether one fellow was overlapping unnecessarily and thereby causing very large increased expense not only to the manufacturer of the plane in selling it, but also to the Government in having overlapping designs.

Mr. LAGUARDIA. What is the present condition of the industry in this country now?

Mr. MORSE. Practically dead, so far as I know. I think a few of the companies are repairing the DH-4s. We have about 125 of them.

Mr. LAGUARDIA. Reconstructing them?

Mr. MORSE. Yes; reconstructing the DH-4s. I think we have 123 of them. They are going through the job more or less rapidly. We also are making some experimental postal planes, as well as some high-speed pursuit planes.

Mr. LAGUARDIA. Mr. Morse, how long would it take your plant to turn out a plane if you were simply given a model without any working plans or drawings?

Mr. MORSE. We figure from six to eight months after getting a sample plane; it takes about two or three months to get working plans, and after that it comes through fairly fast. That does not

mean you could produce in very large quantities, because it requires the manufacture of the special tools, jigs, and the dies for the metal fittings, and it will run considerably in excess of that time if it goes into quantity production. Our past experience shows that it takes about a year to get into quantity production.

Mr. LaGuardia. So that if our production came to a practical standstill in this country and we were met by another emergency, we would go through again practically the same thing we went through before.

Mr. Morse. Something very similar, because the conditions would be somewhat the same, but not quite, because there are more experts than there were before. The knowledge of how to build them is much greater than before in this country, but it would take about one year before we got into quantity production.

STATEMENT OF MR. INGLIS UPPERCUE, AERO MARINE PLANE & MOTOR CO., NEW YORK, N. Y.

Mr. LaGuardia. What is your address, Mr. Uppercue?

Mr. Uppercue. 1881 Broadway, New York.

Mr. LaGuardia. What is the name of your company?

Mr. Uppercue. The Aero Marine Plane & Motor Co.

Mr. LaGuardia. Has your company been producing planes?

Mr. Uppercue. Yes.

Mr. LaGuardia. Are you producing now?

Mr. Uppercue. Yes.

Mr. LaGuardia. What are you producing?

Mr. Uppercue. Producing principally flying boats; working on experimental Navy boats.

Mr. LaGuardia. How big a plan have you?

Mr. Uppercue. We have about 160,000 square feet, built especially for the aviation business, without any Government help and with no Government encouragement.

Mr. LaGuardia. Did you produce anything during the war?

Mr. Uppercue. Yes.

Mr. LaGuardia. What did you produce?

Mr. Uppercue. We were producing a training machine—a pontoon training machine.

Mr. LaGuardia. For the Navy?

Mr. Uppercue. For the Navy.

Mr. LaGuardia. Did you get into quantity production?

Mr. Uppercue. Yes.

Mr. LaGuardia. What are your views, Mr. Uppercue, as to the future development of aviation in this country?

Mr. Uppercue. Mr. Chairman, when I received your telegram I was a little uncertain about the good I could do by coming down here, but since I have heard the testimony given here I think if I could tell this committee that I am optimistic on the matter of aviation I would be helping you some.

I have been in aviation from an experimental laboratory standpoint for over 10 years. I have spent between one and two million dollars in aviation. When I say that I can see a future in aviation I am optimistic as to its ultimate destiny, I do that with

due regard to some things. The immediate commercial returns from aviation are very dubious. I do not believe there is an aviation factory in the country making money. I am quite sure they are losing money to a considerable amount. The only way they will be able to withstand such expenditures is by using their nucleus of a factory, that is, their highly trained engineers and organization men which this country may need during this transition from war to peace and for that reason I think the United States Government is keenly interested in keeping at least alive in regularly established and equipped organizations the machinery and personnel of the airplane factories.

We have not got peace the world over yet. We are threatened from week to week with trouble, and to insure that these factories are kept running the Government should take upon itself some little burden financially in some way to insure that these factories shall keep running or help to reduce this great loss that I believe every legitimate manufacturer is sustaining. In so doing the Government will probably be able to bridge over this uncertain time from a national defense standpoint and at the same time the manufacturer will be progressing in a commercial way and developing machines for commercial purposes and get a foothold. I believe it is a mutual proposition to-day between the Government and the airplane manufacturers. Mr. Keys said awhile ago that the Curtiss Co. is going to spend a million dollars. What are they going to do after they get through with that?

We have tried in every way to turn our airplane plant into other purposes to help keep the airplane division in the plant, but I must confess that we are losing a large sum of money every week, and that will run into several hundred thousand dollars this year. I believe the Government should find some way for keeping the factories alive through this uncertain time, if only from the standpoint of national defense.

As far as the question of a centralized head goes you have heard the testimony of men who were especially sent abroad by this Government to get information such as you are seeking. I think they have made reports that are very favorable.

Looking at it from a layman's standpoint I look upon the air as a third field of defense, and to properly take care of that is going to be in the future of as great if not greater importance than either land or water operations.

We need at the present time governmental supervision of the air; that is, national governmental supervision of the air. We would not make the mistakes which were made in the matter of the control of the development of the automobile in passing State legislation which is going to hamper or retard any possible future of aviation. There is less reason for State regulation of airplane travel than of automobiles, because it is much faster, the States are smaller; they are more like counties when you travel by airplane than they are States when you travel by automobile. So I believe it is highly essential that the National Government take charge of the air travel.

I believe we will have to have some Government Cabinet officer, or some especially created officer to take charge of the air from a de-

fensive and offensive standpoint, because I think the most decisive battles will be won in the air.

The Army and the Navy must have aircraft to supplement their operations. An aviator can be trained in a centralized school and assigned to the Army or the Navy and let them give him his specialized work. You can take the Army aviator and in a few lessons make him an expert Navy aviator, and vice versa in connection with the Navy aviator, who can be made a good Army aviator. So that there is a lot of work that can be done by a centralized head which will not in any way retard either the Army or the Navy development in aviation.

I do not know that I can add very much to your inquiry here. I would like to say this, that as manufacturers we are losing valuable men, under the present conditions. I do not know that the Government could afford to put in all these airplane factories sufficient production now to keep them in full operation, but if they will insure sufficient experimental work to keep their different departments going it will conserve, for the time being, at least, the functioning of these factories, which I think is very important from a national-defense standpoint.

Mr. LaGuardia. You agree with what has been testified as to the time it will require to get anything new in production?

Mr. Uppercue. Absolutely. I might say, so far as the use of an airplane is concerned, in regard to the question asked by Mr. Hull as to why so many people do not like to go up after the first time, that cross-country flying without properly prepared landing fields is a hazardous proposition, but it has been my experience, both personally, as a driver of a hydroairplane and from the experience of my concern, that the water type of machine is a machine that can be commercialized quicker and more safely than any of the heavier-than-air craft that I know of. You have your landing field at all times, as long as you keep over the water, and you can make a safe landing at any time. I have driven from our factory in New Jersey to New York, 28 miles, and it saves me three hours over the land trip, and I think it has good commercial possibilities.

Mr. Olney. You can not keep on indefinitely sinking millions of dollars and not expecting to see some return. There may be patriotism involved in it, and it may be that some day you hope to get back your investment.

Mr. Uppercue. That is right. I think the Government would find it would require only a very small expenditure if it could assure to the legitimate airplane manufacturers, men who have been in the business before, during and after the war that it would be a matter of thousands rather than hundreds of thousands to keep that personnel together during this uncertain time of national defense. I think it is highly essential for this Government to keep a certain number of production airplane factories in operating condition.

Mr. LaGuardia. Has the automobile industry any interest in keeping the aviation industry down?

Mr. Uppercue. I do not believe so. I believe that aviation is too small a factor for them to consider at this time.

Mr. Olney. Would they not be rather interwoven, in a way?

Mr. Uppercue. I should think so.

STATEMENT OF MR. CHARLES F. WILLARD, AERO MARINE PLANE & MOTOR CO., NEW YORK, N. Y.

Mr. LaGuardia. What is your address, Mr. Willard?

Mr. Willard. Room 1800, Times Building, New York.

Mr. LaGuardia. What is your company?

Mr. Willard. The Aero Marine Plane & Motor Co.

Mr. LaGuardia. The same company which Mr. Uppercue represents?

Mr. Willard. Yes.

Mr. LaGuardia. How long have you been in aviation?

Mr. Willard. Since 1907 or 1908.

Mr. LaGuardia. You were in the Government Service during the war?

Mr. Willard. I was.

Mr. LaGuardia. You went overseas on a mission of investigation?

Mr. Willard. I investigated aircraft in England, France, and Italy for the Bureau of Aircraft Production.

Mr. LaGuardia. Have you had occasion to study the systems of England and France?

Mr. Willard. I studied the system in England quite thoroughly, as far as I could with the time I had at my disposal. I was sent particularly to study the technical end. I have a slight knowledge of the general system in France, and a very slight knowledge of that in Italy.

Mr. LaGuardia. You made your visit there in 1918?

Mr. Willard. Yes, sir.

Mr. LaGuardia. Did you find that England, France, and Italy were ahead of us in development at that time?

Mr. Willard. They were far ahead of us in their technical organizations and their method of gathering data and helping the manufacturers with data which, indeed, the manufacturer never would be in a position to search for and to get.

I can cite the case of at least one if not two motors that were financed experimentally by the British Government, as a result of which to-day those motors are probably superior to any motors in the world.

Mr. LaGuardia. What motors are those?

Mr. Willard. The A. B. C. and the Cosmos.

Mr. LaGuardia. What horsepower?

Mr. Willard. The Cosmos is rated as 450 horsepower.

Mr. LaGuardia. How does it compare with the Liberty motor?

Mr. Willard. It is much lighter than the Liberty motor, and it has a different field than the Liberty.

Mr. LaGuardia. Lighter in weight?

Mr. Willard. Much lighter.

Mr. LaGuardia. What does it weigh per horsepower?

Mr. Willard. From a pound and a quarter to a pound and a half.

Mr. LaGuardia. And the Liberty weighs a little over two?

Mr. Willard. Yes; it is a heavier motor. The Cosmos is a rotary stationary air-cooled motor, and it is suitable for the same class of work that the Liberty is suitable for.

Mr. LaGuardia. If it develops 450 horsepower there is no reason why we could not put it on a bomber?

Mr. Willard. Provided it was going to work at high altitudes; but the Liberty engine has possibilities for aviation which we can not look for in these newly developed air-cooled motors, although with this data which a centralized body could gather we would eventually get motors of the air-cooled variety which would be good. It was only possible to do that work with a centralized investigating bureau, because in each of those motors was incorporated knowledge obtained in that way.

Mr. LaGuardia. If we had had in this country in 1917 a central bureau which would have gathered and collated all that information so that we would have had the benefit of what England, France, and Italy had gone through from 1914 to 1917, do you believe that the Liberty motor would have been the result?

Mr. Willard. Yes; I think it would, because France brought out a motor which was parallel to the Liberty, but not quite as good, at about the same time. It is pretty hard to get everything in one motor or any one piece of machinery.

Mr. LaGuardia. And it was a fundamental mistake when they led us to believe that?

Mr. Willard. Yes; it was a little excess enthusiasm. It was lack of knowledge on a part of the group of automotive engineers who got control of the aeronautical situation from the Army and from the aeronautical men who knew.

Mr. LaGuardia. Then you believe that under this organization with available data before it, and an intelligent use of this information, it would have been the logical thing to have gone into production of planes for pursuit work which would have been of great advantage to our Allies, rather than putting all our eggs into one Liberty basket?

Mr. Willard. I think we should have developed some more types, and used American designs which did exist, but which the powers in control refused to accept. But through ignorance and through the desire on the part of the people who got into control, those designs were smothered, and it is very evident for what reason.

Mr. LaGuardia. Now they are coming to life?

Mr. Willard. Now they are coming to life and being adopted by the real Army people.

Mr. LaGuardia. Mr. Willard, do you believe a centralized department, taking jurisdiction over all aviation activities would be a source of help and encouragement to the aviation industry?

Mr. Willard. If that bureau is created somewhat along the line which Mr. Hull has outlined, but at some point allows the Navy, for example, to exercise jurisdiction over the operation of its own planes.

Mr. LaGuardia. During an operation?

Mr. Willard. Yes. I have in mind particularly a plane which would be unloaded on board a battleship. There must be some point where the power of this centralized bureau terminates with reference to operations. I am not a military man and only know military necessities from contact with them. The men who are specialists would know at what point a centralized body should cease control over operations and turn that over to the Navy.

Then, a centralized body will save the people of the United States many millions of dollars, if it is put into effect, because we have the Army and Navy at the present time carrying on parallel experiments with motors, planes, ordnance, and accessories of all kinds. In order to get a thing adopted or have it used on a plane it has to be submitted to the Navy individually and to the Army individually, and that costs the manufacturer a great deal and really raises the prices of the machines. If a centralized bureau had one contracting system, it would eliminate the parallel work and would really save to the taxpayers many millions of dollars every year.

Mr. LaGuardia. So you feel if we could establish flying fields throughout the country, with a proper system of signals, with proper wireless control and encourage the development of the Air Service to its fullest extent and the use of aviation in all branches of the Government where it is possible, under a centralized department, we would in that way be giving the industry the stimulus and en encouragement it requires?

Mr. Willard. A part of the stimulus it requires; but I believe it is necessary for some financial aid to come along, as well as to have these aerial roads. There must be something to give the manufacturer some actual airplanes to work upon, and they must be paid for, and not necessarily simply put in shape and then not used. I do not think there is any manufacturer who wants to have that condition brought about.

Mr. LaGuardia. They do not ask anything more than honest orders for equipment which the Government would use.

Mr. Willard. No. I have no personal ax to grind in saying it, but if the manufacturers do not receive some encouragement in the way of orders for some proper material to build, to bridge the manufacturers over until the public gets more confidence in the airplane as a vehicle, the manufacturers are bound to close up. It is a flat financial fact that you can not go to the financial district in the center of the world to-day and get 10 cents for an airplane project because they have not the confidence that the public has the confidence.

Mr. Hull asked why it is that people do not repeat their trips in airplanes. It is purely a matter of psychology. Man has always had a fear of flying, and it is going to be through the young generation, who have grown up with the idea that we can now master the law of gravity and stay in the air, to bring about the manufacture of increased quantities of airplanes. It is going to be difficult to get many of the older people to realize that we can do that and get the fear of flying out of their minds. You are asking them to put out of their minds in a few months a thing that has been instilled into their minds for generations.

Mr. LaGuardia. It is also expensive to fly.

Mr. Willard. It is expensive to fly, and it is expensive to build planes, because without quantity production you can not get cheap construction.

Mr. Uppercue. Mr. Chairman, I would like to make a statement about the manner in which the Government has given airplane manufacturers work on experimental machines. They have required manufacturers to bid on experimental machines, and that is absolutely unfair. The only reason a manufacturer will bid on an ex-

perimental plane is with the hope that he might get an order for some more.

We have a case in point now. We took a Navy order for three experimental machines because we wanted work of any kind to help cut down our expenses. They are taken at tremendous loss. If the Government is going to try to help, we should find some other way than by giving them work at a sure loss.

Mr. WILLARD. But notwithstanding that, it has been a fact that the Government has asked the manufacturers to develop new types at prices which are below production prices, so to speak. The departments must realize that development work can not be compared in price with production work, but at the present time they do not realize that. They ask you to bid, and they take into consideration the bids of unsophisticated contractors who come into the business, and if you do not approximate those bids they can not make the purchase. I was told of an official in one of the departments who, when told that a certain factory was going to lose money on a contract, said, "Well, the department rather expected him to lose money, and to collect on the bond." You can not expect that such a speech as that will encourage manufacturers to make money. That speech was made in my office by an official in one of the departments. It is up to the Government to encourage the manufacturers.

(Thereupon the subcommittee adjourned to meet to-morrow, Friday, December 12, 1919, at 10.30 o'clock a. m.)

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Friday, December 12, 1919.

The subcommittee met at 10.30 o'clock a. m., Hon. Fiorella H. LaGuardia presiding.

STATEMENT OF MR. GLENN L. MARTIN, OF THE GLENN L. MARTIN CO., CLEVELAND, OHIO.

Mr. LAGUARDIA. What is your address, Mr. Martin?

Mr. MARTIN. Cleveland, Ohio.

Mr. LAGUARDIA. Are you the designer of the Martin bomber?

Mr. MARTIN. Yes, sir.

Mr. LAGUARDIA. Are you producing planes now?

Mr. MARTIN. Yes.

Mr. LAGUARDIA. How long have you been producing planes?

Mr. MARTIN. Since 1909.

Mr. LAGUARDIA. You were one of our first flyers?

Mr. MARTIN. Yes, sir; in the early days.

Mr. LAGUARDIA. Are you connected with any factory?

Mr. MARTIN. With the Glenn L. Martin Co., of Cleveland, Ohio.

Mr. LAGUARDIA. What was your factory producing during the war?

Mr. MARTIN. During the war we produced 50 training ships on the west coast and then closed the shop.

Mr. LAGUARDIA. Those were elementary training ships?

Mr. MARTIN. Yes.

Mr. LAGUARDIA. When did your first bomber come out?

Mr. MARTIN. It was flown on August 17, 1918.

Mr. LAGUARDIA. Have you any orders for that now?

Mr. MARTIN. From the Navy, and for some mail ships for the Post Office Department.

Mr. LAGUARDIA. We wanted your views on this subject. This subcommittee is studying the question of a separate or a united Air Service. Do you believe a united Air Service, having under its jurisdiction all aerial activities of the Government, would stimulate and encourage the aeronautical industry in this country?

Mr. MARTIN. I do; but just how the Army and the Navy Departments would procure their material or get their specialized applications is not for me to say. I am not a military expert.

Mr. LAGUARDIA. Do you consider the present system, in which we have two technical divisions and two training systems, as conducive to the development of the air industry in this country?

Mr. MARTIN. It is not. It breaks up the continuity of work in a plant. When we take an order from the Navy we have to reorganize a number of our departments in order to do the work under a new kind of specifications and new method of operation.

Mr. LAGUARDIA. Do you believe that the Postal Service in this country has been fully developed, or can it be extended?

Mr. MARTIN. It can be extended, and it is being extended extended rather rapidly. I feel there is a very important development that should take place in the aerial mail service.

Mr. LAGUARDIA. If we develop the aerial mail service and keep a large number of pilots in constant flying condition and also keep the industry going, would that not give us the possibility of having a large air force in time of an emergency?

Mr. MARTIN. I believe it would be vital, because we would have the personnel capable of producing aircraft, and if we have not that personnel ready it takes months to get it. And then, too, the training of pilots for service in war is not a matter of a few months, but it is a matter of a year or more.

Mr. LAGUARDIA. And the same thing is true in the matter of production?

Mr. MARTIN. That is right.

Mr. LAGUARDIA. How long would it take your plant to get a plane in quantity production if you simply had a model and no working drawings?

Mr. MARTIN. Approximately a year for the first machine.

Mr. LAGUARDIA. That is a point that we especially wanted to have determined by an expert in such matters. We thank you, Mr. Martin.

STATEMENT OF MR. J. K. ROBINSON, THE GALLAUDET CO., EAST GREENWICH, R. I.

Mr. LAGUARDIA. What is your address, Mr. Robinson?

Mr. ROBINSON. East Greenwich, R. I.

Mr. LAGUARDIA. Are you connected with the Gallaudet Co.?

Mr. ROBINSON. Yes.

Mr. LaGuardia. They have a plant?

Mr. Robinson. Yes.

Mr. LaGuardia. Where is that plant located?

Mr. Robinson. At East Greenwich, R. I.

Mr. LaGuardia. Are you producing planes now?

Mr. Robinson. No; we are making changes on the De Haviland planes for the Army.

Mr. LaGuardia. Since when has the Gallaudet Co. been producing planes?

Mr. Robinson. This present corporation since the latter part of 1917.

Mr. LaGuardia. But the Gallaudet Co. existed prior to that?

Mr. Robinson. There were other corporations.

Mr. LaGuardia. With the same plant?

Mr. Robinson. No; not the same plant.

Mr. LaGuardia. What was your company producing during the war?

Mr. Robinson. Navy planes, H S flying boats.

Mr. LaGuardia. You have heard the testimony before the subcommittee on yesterday and to-day given by the various gentlemen representing the aviation industry. Will you let us have your views briefly on the subject?

Mr. Robinson. In regard to a united air service I feel that it is vital to keep the industry alive. The cost to the Government is very excessive under the present methods. During the war we were building some experimental Army machines and also Navy machines which obliged us to have three stock rooms and two sets of inspectors. This expense could be eliminated by having one service. In order to develop the commercial end of aviation we feel that a united air service could establish fields and map air routes in order to make flying safe for cross-country work. The matter of insurance, the matter of legislation, uniformity of signals and of flying fields could be taken up in a centralized way by this central department, and also the matter of the licensing of pilots.

Mr. LaGuardia. Is it not essential, in order to get as many airplanes as possible to keep the aircraft industry going in order to have a supply in time of emergency?

Mr. Robinson. Absolutely.

Mr. LaGuardia. And it is something which we have learned from past experience can not be created overnight, regardless of how many well-developed and well-organized automobile or furniture factories we may have?

Mr. Robinson. No, sir; it can not.

Mr. Olney. Is the existence of your plant at stake, so far as its future is concerned?

Mr. Robinson. Yes; the existence of the aeronautical plant is at stake. After the delivery of the present orders it will have to continue allowing the engineering force and the trained aviation mechanics to go.

Mr. Olney. How much floor space have you in your factory?

Mr. Robinson. About 150,000 square feet.

Mr. Olney. You have a two-story building?

Mr. Robinson. One part of it is two stories.

Mr. Olney. A going plant, which might employ 100 hands?

Mr. ROBINSON. We employed 800 during the war.

Mr. OLNEY. Built for war purposes?

Mr. ROBINSON. No, sir. We started half of it before the war in order to develop the Gallaudet machine and to get out experimental flying boats.

Mr. OLNEY. Are you contemplating orders from private individuals or from private industry?

Mr. ROBINSON. We have requests all the time, and we are designing a land machine and a water machine; one of five-passenger capacity and one of three-passenger capacity.

Mr. OLNEY. Do you think the airplane might be useful as a commercial proposition in carrying freight and passengers as well as mail in the future?

Mr. ROBINSON. Yes, sir; it is being utilized very extensively in foreign countries, and I do not see why we can not have greater use for it than the countries in Europe. Our distances are greater.

Mr. OLNEY. Have you developed any particular style of engine today that is superior to any other?

Mr. ROBINSON. We have no engine plant. We have been using the Liberty engine.

Mr. LAGUARDIA. You believe there is a future for commercial aviation, eventually?

Mr. ROBINSON. Absolutely; yes, sir.

STATEMENT OF LIEUT. COMMANDER P. N. L. BELLINGER, OFFICE OF NAVAL OPERATIONS, NAVY DEPARTMENT.

Mr. LAGUARDIA. Commander, what is your present assignment of duty?

Commander BELLINGER. I am in Operations, Material, Navy Department.

Mr. LAGUARDIA. You were the commander of one of the Navy flying boats in the first trans-Atlantic flight?

Commander BELLINGER. Yes, sir. In command of the NC-1.

Mr. LAGUARDIA. You are now engaged in aviation duties?

Commander BELLINGER. Yes, sir. Handling aviation material.

Mr. LAGUARDIA. Under what system is naval aviation now controlled? It has been testified here by Admiral Taylor that you have no head of aviation, that the material and equipment is distributed among the various bureaus, just as in the case of other naval matters.

Commander BELLINGER. Aviation in the Navy is handled the same as ships, or any other material for the Navy.

Mr. LAGUARDIA. So that the various bureaus have jurisdiction and control over the various parts of the plane and motor.

Commander BELLINGER. Yes. There is a Planning Section on Aviation, the senior member of which is called Director of Aviation. He is the nominal head of aviation. But he has no administrative authority.

Mr. LAGUARDIA. Is that functioning satisfactorily now, as far as aviation goes?

Commander BELLINGER. No, sir; I would not say it was.

Mr. LAGUARDIA. Would you consider that an ideal system for the development of aviation?

Commander BELLINGER. No; I would not.

Mr. LAGUARDIA. The Army is now training some of the naval pilots, is it not?

Commander BELLINGER. Yes.

Mr. LAGUARDIA. And besides your naval aviation you also have your Marine Corps aviation?

Commander BELLINGER. Yes, sir.

Mr. LAGUARDIA. And they are functioning separately, too, are they not?

Commander BELLINGER. Yes; they have two stations.

Mr. CALDWELL. You mean only in the matter of operation, not construction?

Commander BELLINGER. They get their material through the Navy channels.

Mr. LAGUARDIA. Are they making their own minor repairs?

Commander BELLINGER. Yes.

Mr. LAGUARDIA. But not the major repairs?

Commander BELLINGER. As far as their stations are concerned——

Mr. LAGUARDIA (interposing). They have their station work?

Commander BELLINGER. They operate two stations and they do as much repair work as those stations are capable of doing.

Mr. LAGUARDIA. Who trains the Marine Corps pilots?

Commander BELLINGER. During the war they had a special school for training Marine Corps pilots, and at the present time they train their own pilots who are coming in.

Mr. LAGUARDIA. You were overseas during the war, were you not?

Commander BELLINGER. No; I was at Hampton Roads, the Naval Air Station at Hampton Roads.

Mr. LAGUARDIA. Do you believe, commander, that a united air service that would embrace all the aerial activities, such as production, technical material and supplies and primary training, and all air fighting would be conducive to a better air service for this country?

Commander BELLINGER. Properly organized, yes; I do, with this provision, that both the Navy and the Army should have control over the units operating with them.

Mr. LAGUARDIA. Such as aviation—flying from ships?

Commander BELLINGER. Yes. It should be so closely related to it that it would be considered practically a part of the Navy and a part of the Army.

Mr. LAGUARDIA. For instance, in bombing projects like the northern bombing project and the pursuit work, that would necessarily be under the air command; do you not think so?

Commander BELLINGER. Yes; I do.

Mr. CALDWELL. You realize, do you not, commander, that we will never get real operation or development of the Air Service until we have stimulated commercial aviation to the extent that the money of private parties in the United States is put into it rather than making it a governmental proposition?

Commander BELLINGER. Yes.

Mr. CALDWELL. What would you think of the idea of creating a commission somewhat similar to the Interstate Commerce Commission which would have power to supervise the organization of com-

panies and to grant monopolies for the operation of commercial aviation between the big cities or other portions of the United States? Do you think that would stimulate the production and use of aircraft in a commercial way?

Commander BELLINGER. I think it would help.

Mr. CALDWELL. Do you not think it would do it more than the Government will do it by putting Government money into it?

Commander BELLINGER. No; I do not think so.

Mr. CALDWELL. Have you thought about it?

Commander BELLINGER. I think Government money and Government backing has got to be given to it to promote aviation throughout this country until——

Mr. CALDWELL (interposing). If you put Government money in it, and if a man who goes into it stands to win whether he does anything or not, he will not have the same incentive to win and will not put the same energy in it as he would if he puts his own money into it?

Commander BELLINGER. No; but aviation at the present time, commercially, can not stand on its feet and it has got to be assisted.

Mr. CALDWELL. We have great cities like Chicago, St. Louis, New York, Boston, and Philadelphia, between which there is already established a certain amount of traffic, both in passenger, and mail, and freight service. If a monopoly was granted to a person with enterprise and money to operate a certain route, it would tend to stimulate him to take a chance on that proposition, would it not?

Commander BELLINGER. If he saw he could make a good thing out of it. But I think it would be very short-sighted policy to grant a monopoly on a proposition which most probably will become a public utility.

Mr. CALDWELL. He would have to make a good thing out of it or lose his money.

Commander BELLINGER. Yes.

Mr. CALDWELL. But if the Government put its money into it, he would not have to make anything out of it at all to get his money.

Commander BELLINGER. No; but in aviation if you have unlimited capital you can make money, but if you have only a certain amount you may lose it all.

Mr. CALDWELL. What do you think it would cost the United States Government to give the necessary financial backing to establish commercial aviation?

Commander BELLINGER. It would be very difficult to say, because practically every city and every large town would have to assist in certain ways, just the same as we have good roads for automobiles.

Mr. CALDWELL. What would you favor as a gross outside sum for the United States Government to advance for the development of commercial aviation? You are a citizen of the United States, just the same as the rest of us, and you would have to pay a part of it. Now, just tell us what your idea would be as to the outside limit on the amount of money the Government should put up for stimulating commercial aviation?

Commander BELLINGER. Well, personally, I would like to see $300,000,000 put up.

Mr. CALDWELL. We spent $640,000,000 in a few months and did not get anything.

Commander BELLINGER. We got a little experience.

Mr. CALDWELL. Do you think we would get much else besides experience with $300,000,000?

Commander BELLINGER. That is for one year, you mean?

Mr. CALDWELL. Yes, for one year.

Commander BELLINGER. That is not the limit; I mean that would be necessary, I think, for the Government to put up each year, $300,000,000 a year, and I think that would assist quite a bit. We would go ahead on the assumption that more was coming in the following year.

Mr. CALDWELL. How much money did the Navy spend on aviation?

Commander BELLINGER. About $179,000,000.

Mr. CALDWELL. In organizing your Aviation Corps, what technical branch of the Navy was assigned to the duty?

Commander BELLINGER. There is no Aviation Corps in the Navy.

Mr. CALDWELL. In organizing your aviation service, what technical branch of the Navy was given that duty—the Bureau of Steam Engineering, was it not?

Commander BELLINGER. Every bureau in the Navy Department has certain technical duties connected with it. The Bureau of Construction and Repair has charge of the hull material, that is, the hulls of the boats and the wings; in other words, what relates to the structure, other than motor power and plants. The Bureau of Steam Engineering has charge of all power plant material and design and development. The Bureau of Ordnance has charge of all ordnance material, and the Bureau of Navigation has charge of navigational instruments.

Mr. CALDWELL. In other words, when the Navy organized its Air Service it applied to the technical men in its service who had particular skill in the particular class of work they were particularly required to do.

Commander BELLINGER. They organized those sections in those different departments.

Mr. CALDWELL. They organized a little section in each one of the departments, and they functioned through what department?

Commander BELLINGER. They coordinated their work through the Office of Operations.

Mr. FULLER. I would like to ask the Commander whether I understand correctly that it is his opinion that we can not develop an efficient air service for the Army and Navy until aviation is made a commercial success?

Commander BELLINGER. I would not say that exactly; but we will never have all the facilities available until it is made a commercial success.

Mr. FULLER. Why so?

Commander BELLINGER. In my opinion, every aircraft built in this country should have a possible warlike mission, so that it can be available in case of necessity. A passenger-carrying aircraft should be able to be diverted to some warlike mission, and that should be known at the time that aircraft is built. It may not be built primarily for any warlike mission, but it might be diverted to it.

Mr. FULLER. Where in the world to-day is aviation a success commercially?

Commander BELLINGER. I do not know how much money they are making out of it, but they are doing quite a bit of it around England.

Mr. FULLER. Not where they are standing on their own feet, are they?

Commander BELLINGER. No; they have an air service over there.

Mr. FULLER. That being the case, would you still contend it was necessary that aircraft should be a success commercially before we go ahead on a program that would give us an efficient air force in the Army and the Navy?

Commander BELLINGER. No; I do not contend that.

Mr. FULLER. Did you not estimate a short while ago what it would cost the Government to make aircraft a success commercially?

Commander BELLINGER. My answer to that question was based on the assumption that in case a separate air service was formed, how much money should be appropriated for it.

Mr. FULLER. There is not any necessary relationship, then, between our having an efficient Air Service in the Army and Navy and aviation being a success commercially?

Commander BELLINGER. Not as to existing conditions. In other words, there may be an efficient Army and Navy Air Service and there may be no commercial aviation. But in case of a war, in order to bring the capacity of the country to its maximum it would be necessary to have a very large commercial industry in existence then, in order to assist both the Army and the Navy.

Mr. FULLER. It would be desirable, but not necessary?

Commander BELLINGER. It would be very desirable.

Mr. CALDWELL. What would you think of a subsidy to the commercial manufacturers, in the nature of financial assistance to the men engaged in the business?

Commander BELLINGER. I think that would help aviation a lot; it would help the industry.

Mr. CALDWELL. Have you given the matter any thought along that line?

Commander BELLINGER. Yes. To a certain extent, on a very small scale, it has been necessary to do that. In other words, when companies fell down on contracts, in coming up to the original specifications, the material was accepted, sometimes knowing that the Navy could not necessarily make its full use of it, for the reason that it had to be promoted to a certain extent.

Mr. CALDWELL. How far would you go in time of peace toward helping manufacturers to stay in business, and encourage them?

Commander BELLINGER. I do not know how far I would go, but it should be looked into as a necessary thing to do.

Mr. CALDWELL. The Navy has already a plant of its own for the construction of aircraft, has it not?

Commander BELLINGER. To a certain extent. It does not manufacture all its aircraft, but a percentage of them.

Mr. CALDWELL. It let out a part of its work to private enterprise?

Commander BELLINGER. Just what do you mean by that?

Mr. CALDWELL. A part of its contracts for the construction of aircraft.

Commander BELLINGER. A part of the Navy contracts were let to private enterprise.

Mr. CALDWELL. Do you think it would be a good plan for the Army to adopt to divide its work between Government plants and the plants of private individuals?

Commander BELLINGER. Well, a large experimental plant is needed more than a manufacturing plant. It is not necessary to supply materials. When it knows what it wants it can have private manufacturers supply its needs.

Mr. CALDWELL. Is that the policy pursued by the Navy?

Commander BELLINGER. We have a plant which it was necessary to build during the war, and we are utilizing that, but to a certain extent we are letting outside contracts.

Mr. CALDWELL. The Army has adopted the other policy, of shutting up its plants entirely, and as between the two policies, which one do you think would be the fairest to the Government and the most advantageous to the country?

Commander BELLINGER. If all contracts were let out to private contractors it would assist aviation, and it would promote aviation in the United States, but if you let out contracts you have got to know just what you want.

Mr. CALDWELL. And the place to find that out is in a Government plant, you think?

Commander BELLINGER. Yes. Experimental plants.

STATEMENT OF COL. H. H. ARNOLD, AIR SERVICE.

Mr. LAGUARDIA. Colonel, how long have you been in the Army?

Col. ARNOLD. I graduated from West Point in 1907.

Mr. LAGUARDIA. How long have you been in the Air Service?

Col. ARNOLD. Off and on since 1911.

Mr. LAGUARDIA. What are your present duties

Col. ARNOLD. I am Department Air Service officer of the Western Department, located at San Francisco.

Mr. LAGUARDIA. We have had the testimony of a number of officers of the Air Service, and we would like to get your views in reference to a united Air Service.

Col. ARNOLD. I want to say first, Mr. Chairman, that I am not familiar with the testimony which has been given heretofore, and if I repeat what has been said already, I hope you will excuse me as I only arrived from California this morning.

At the present time we have in the United States two large technical sections engaged in work in connection with the development of aviation. Both have experts in several lines, neither of which sections is combining brains toward the production of the best aircraft possible. The Navy is working along its lines and the Army is working along its lines.

During the war we tried to bring them together by joint Army and Navy committees or boards. We had five such committees or boards during the war. I was a member myself of three of them and sat in with one more. I know they were not a success then and they will not be a success in the future.

The supply of three separate aircraft operations is carried on independently, in the Post Office Department, in the Army, and in the Navy. Parts are thrown away as obsolete and unserviceable in

the Army and of no use to the Navy, which might be used by the Post Office Department, but that is not considered. They are classed as obsolete in the Army. At the present time we are carrying a very large overhead of technical supplies and operations that could be combined under one head and thereby save a considerable amount of money in salaries of personnel alone.

Commercial aviation to-day is in its infancy. It is waiting for something to happen so it can branch forth and develop aircraft, so that aircraft will become an important factor in transportation. Commercial companies are afraid to start in the transportation business because they have no backing of any kind and no assurance from the Government as to what the future aircraft policy will be.

Any individual to-day can get a machine and start a company to carry passengers, regardless of whether he is a qualified pilot, or whether he has a machine that should be allowed to go in the air or not. In other words, there is not one controlling agency in the United States to-day which has anything to say about aviation. When commercial firms want to get advice on matters relative to aviation they look to somebody to go to, and they go to the poor Army officer and they say "What shall we do? Do you think this will be a success? What are the laws connected with the use of this thing? Can we use Government fields?"

In that connection I want to say that if we had a combined air service the Post Office Department and the Army and the Navy might combine to the use of some of the fields and thereby save a lot of money to the Government also. At the present time the Navy has its stations on the coast, and the Army has its stations. The Army put in seacoast defense stations and the Navy put in additional stations, and we might use the Navy stations for seacoast defenses. But as it is now, without a single head of aviation, none of these things is being done and yet everybody asks what became of the large appropriations spent on aviation.

Mr. LaGuardia. How far would you extend the jurisdiction of a separate air department to fighting?

Col. Arnold. I would think it possible if you created a separate air service to have all the primary training and supply under a separate air service, and all the advance training for pursuit and bombardment work would be under a separate air service, and the advance training for observation could be done in connection with the Army, the actual control of observation units to be under the arm to which they are attached during the time they are attached to the Army or the Navy, which, of course could be permanent.

Mr. LaGuardia. The observation units would not be able to function to their fullest extent unless protected by pursuit planes?

Col. Arnold. No, sir.

Mr. LaGuardia. And the attack on the lines of communication could not be successfully carried on unless the air had been cleared of the enemy's attacking planes?

Col. Arnold. Yes, sir; that is true.

Mr. LaGuardia. Then should the work of clearing the air in order to permit observation to function be under the air force?

Col. Arnold. I should say that any air force troops assigned for duty under an Army commander should be absolutely under that commander during the time they are under that command.

Mr. LaGuardia. Of course; under the commander in charge of operations.

Col. Arnold. Whoever he may be.

Mr. LaGuardia. But after the commander had issued an order that he wanted operations carried on in a certain section, the fighting and the tactical command should be under the direct jurisdiction of the commander of the air forces; do you not think so?

Col. Arnold. Yes; I think it ought to be.

Mr. LaGuardia. And the same with supplies and equipment and everything that goes with aviation; it should all be under the air force?

Col. Arnold. I think it ought to be.

Mr. Caldwell. Would you advocate that the training of all commercial aviators should be under the Army or the Navy?

Col. Arnold. My ideas about commercial aviation do not seem to agree with those of everybody else. I think commercial aviation should develop in about the same way that the automobile industry developed; if possible, you should stimulate these companies by giving them Government assistance; but the companies should be allowed to stand on their own feet. If they do not see fit to take reserve officers from the Air Service to act as their pilots, all right. But I should say if we subsidized those companies it should be with the understanding that their pilots and planes shall be turned over to the Government for Government use in case of necessity.

Mr. Caldwell. What would you think of granting a monopoly between the great cities of the country, such as has previously been referred to? Do you think that would stimulate commercial development of aviation?

Col. Arnold. Under that system at the present time there would be so very few companies able to carry on that I doubt whether it would be a success. The average citizen of the United States to-day has not got the money available to put into a large commercial firm of the size you would have to have in order to make it a success.

Mr. Caldwell. What would you say about granting governmental aid to a company which was granted a monopoly?

Col. Arnold. If you give it governmental aid I think it would be a success. I think that is the only way you will ever get an air force in the United States capable of being compared with the air service which England is developing.

Mr. Caldwell. Of course, in some places they would have to have more aid than in others.

Col. Arnold. That is right.

Mr. Caldwell. So, if we have an air service commission similar to the Interstate Commerce Commission that would be given the privilege or authority to ask for bids from men who would show sufficient backing, on a percentage basis, and how much governmental aid they would need, do you think we would be able to develop that kind of a service between great cities? For instance, we would say that an air line has been established between New York and Boston, and that on a certain day we will receive bids from people, and preference will be given to those who will offer the best bid, and such qualifications as ability and the best demonstrated character would also be considered. Do you think that would be a fair and reasonable way to develop it?

Col. ARNOLD. I think that would be a move in the right direction for the development of commercial companies. The only point I am doubtful about is the degree of control that the Government has over this company. If you go ahead and say we will create another department and another set of inspectors and another group of accountants you are adding more to your present overhead, and you are not getting anywhere. That is the trouble now, that we are always compounding on our present overhead.

Mr. CALDWELL. You think our principal job here is to relieve the Government of overhead expense?

Col. ARNOLD. I think that is one of the troubles to-day, that we have so many minds directing aviation along different roads, so that we are digressing instead of getting together at some one fixed point, which is an adequate and efficient service for the United States.

Mr. CALDWELL. Suppose we have a united control of that character and have a system of licensing so that the Government would have a voice in what is done, and do away with the individual and separate organizations we have now and then attempt to create monopolies that would be assisted by the Government during a period of years?

Col. ARNOLD. I think that would be fine.

Mr. FISHER. I want to read a sentence from the conclusion which has been reached by the National Advisory Committee for Aeronautics. It says: "There were great delays in the effective use of the forces at hand before the war."

Do you agree with that conclusion, that the cause of our trouble was primarily due to a lack of proper scientific and technical foundation before the war?

Col. ARNOLD. I do not believe that is the fundamental reason why everybody says the air service was a failure during the war.

Mr. FISHER. But if there were delays, were not those delays due primarily, as stated here, to the fact that we were new in the field and that aviation was being developed more rapidly in other countries by the stimulus of necessity, more so than it was with us?

Col. ARNOLD. I do not know exactly to what they are referring there when they are talking about delays.

Mr. FISHER. They were referring to delays in getting an active air force in the field. There were delays on the part of this country in getting an active air force.

Col. ARNOLD. You mean the whole Air Service?

Mr. FISHER. Yes.

Col. ARNOLD. The delay in getting an air service to the front was purely in the matter of material and not personnel, and so you can eliminate personnel.

Mr. FISHER. You can eliminate personnel because the personnel was rapidly trained?

Col. ARNOLD. Yes.

Mr. FISHER. Now, then, the trouble was with the question of airplanes?

Col. ARNOLD. The airplane was the crux of the whole proposition. I made a statement before the Senate Committee on Military Affairs that when you want to get a suit of clothes made you do not send

for a butcher; no more should you have an automobile engineer design an airplane. That was the trouble with our air service during the war.

Mr. FISHER. Were there many men in this country who were familiar with the technical matters in connection with the building of airplanes and aviation engines at the time we entered the war?

Col. ARNOLD. They were sufficient if they had been properly used.

Mr. FISHER. You register a complaint against the Aircraft Board?

Col. ARNOLD. I do not register a complaint against any board.

Mr. FISHER. You do not think——

Mr. FULLER (interposing). You simply think there were not as many tailors as there were butchers?

Col. ARNOLD. That is it.

Mr. FISHER. I would like to ask you who you think ought to have been placed on the Aircraft Board instead of those that were placed on that board?

Col. ARNOLD. In the civilian members of the board you should have had civilian experts in aviation.

Mr. FISHER. I am specially asking you that question so that you may suggest some names.

Col. ARNOLD. I prefer not to go into personalities.

Mr. FISHER. We did have men who would have been willing to have given up the actual manufacture, where they were very greatly needed, and come to Washington to direct the work? You say you are familiar with men of that kind, but do not care to give their names, men who were familiar with aviation engineering and were ready to give up their work and come here?

Col. ARNOLD. I made no such statement, sir.

Mr. FISHER. Were there such men available?

Col. ARNOLD. I have never mentioned the Aircraft Board. I believe you have mentioned them.

Mr. FISHER. I would like to get some ideas from you as to whether or not their work, looking at it from the standpoint of time, was satisfactory to a man who believed in the development of aviation. That was the reason I asked the question, and you decline to answer that?

Col. ARNOLD. I decline to answer that.

Mr. FISHER. You are then a believer in the development of aviation by experimental stations and experimental plants?

Col. ARNOLD. The combination of the technical experts in all branches of the service at one experimental station where you can have all the different departments, and if there is something new developed on one engine or plane, say in the Navy branch, then let both the Army and Navy use it, and the same thing in regard to the Post Office Department.

Mr. FISHER. We are now considering a proposition in the House in regard to a question which materially affects the development of aviation, as to whether or not the Government ought to have an experimental station in the city of Dayton, Ohio. Have you any ideas in regard to the plant out there, at all?

Col. ARNOLD. I have been through the plant.

Mr. FISHER. You are familiar with it?

Col. ARNOLD. I am familiar with the plant.

Mr. FISHER. What is your judgment relative to Dayton, Ohio, as an aviation engineering center? I want your honest opinion about it.

Col. ARNOLD. My judgment would not be good at this time. I have been out in San Francisco such a long time that I do not know what your present aviation program is, and without that knowledge I could not say.

Mr. FISHER. If you believe in the development of aviation along technical lines and believe in having a large experimental station, which you say you do believe in?

Col. ARNOLD. I do.

Mr. FISHER. Is Dayton, Ohio, a center for technical engineering experts along the lines of airplane engineering?

Col. ARNOLD. The only objection I could see to it at this time would be that you could not develop Navy planes at Dayton, Ohio.

Mr. FISHER. I did not get an answer to my question, but I infer you do not consider it a good place. Do you consider it a good place, or do you not consider it a good place?

Col. ARNOLD. You could not——

Mr. FISHER. If you decline to answer and have no judgment about it, I would like to know whether or not you are familiar with aviation experts?

Col. ARNOLD. I know most of them.

Mr. FISHER. You said they ought to have been chosen for the Aircraft Board, but were not, and I will ask you where is the center of experts, the center for the technical laborers who work in those plants and the engineers to have a congenial atmosphere for such work?

Col. ARNOLD. There have been a number of such centers. There was one at Buffalo, and there was one started at Dayton during the war. The Navy has one at Washington. They have another at League Island; the Army has one at McCook Field, and Mr. Martin has one at Cleveland, Ohio.

Mr. FISHER. You say they had one at Dayton; now you say the Army has one at McCook Field. Do you mean that there are two at Dayton?

Col. ARNOLD. I mean the Dayton-Wright Co. had one in addition to the Army.

Mr. FISHER. Would you consider Dayton, Ohio, then an aviation center or not?

Col. ARNOLD. Yes, I do.

Mr. FISHER. And you consider Buffalo an aviation center?

Col. ARNOLD. Yes, sir.

Mr. FISHER. What other places?

Col. ARNOLD. Cleveland, Ohio.

Mr. FISHER. What others?

Col. ARNOLD. League Island, Philadelphia.

Mr. FISHER. What others; I mean aviation centers for engineers.

Col. ARNOLD. For engineers?

Mr. FISHER. And technical workmen.

Col. ARNOLD. There is another at Washington; the Navy has, I believe, designers in Washington.

Mr. FISHER. Are there private plants located at each of these places you have named where there are other activities going on?

Col. ARNOLD. In some there are and in some there are not.

Mr. FISHER. In view of your great familiarity with the engineers I would like you to state where in the places named there are private plants and where there are not.

Col. ARNOLD. There is a private plant at Cleveland, Ohio; there is a private plant at Buffalo which has technical experts.

Mr. FISHER. I would like for the information of the committee to have in the record the names of the private plants.

Col. ARNOLD. There is the Martin Co. at Cleveland, Ohio; the Curtiss Co. at Buffalo, the Curtiss Co. at College Point, Long Island. They are the only one I know of off hand.

Mr. FISHER. Are those plants all now turning out airplanes, today?

Col. ARNOLD. Every one of them.

Mr. FISHER. Do you know anything as to the number of airplanes they are manufacturing?

Col. ARNOLD. I have no idea.

Mr. FISHER. Then the airplane industry in this country is not stagnant now?

Col. ARNOLD. I would not say it was stagnant.

Mr. FISHER. Have we made progress since the war in it? Has any progress been made in aviation since the armistice, looking toward the development of airplanes?

Col. ARNOLD. The only progress I know of made during the war——

Mr. FISHER (interposing). I mean since the war.

Col. ARNOLD. The development since the war has been the building since the war of machines designed during the war for use in the war.

Mr. FISHER. But there has been in none of the places you speak of any work in the development of aviation along broad lines, looking toward the improvement of the air service.

Col. ARNOLD. They have converted some wartime planes into commercial planes by changing the form of the body, changing the landing gear and taking off the bomb racks.

Mr. FISHER. It has been along reconstruction lines and not along new lines.

Col. ARNOLD. That is my idea of it; yes, sir.

Mr. FISHER. Then the Air Service itself has not progressed as it should have since the armistice?

Col. ARNOLD. Not as rapidly.

Mr. FISHER. What do you think is the cause of that failure to progress?

Col. ARNOLD. It would be a lack of a well-defined policy of aviation development in the United States.

Mr. FISHER. By that do you mean that no one in the Army had any plan for the permanent progress of aviation?

Col. ARNOLD. There are too many plans; that is the trouble.

Mr. FISHER. Do you know whether or not the Congress of the United States has done anything along that line?

Col. ARNOLD. I have not seen it if they have.

Mr. FISHER. Do you consider that Congress has also a part to play in that?

Col. ARNOLD. Congress has got to play the predominating part.

Mr. FISHER. Legislation has to be enacted before anything can be done?

Col. ARNOLD. Legislation must be enacted.

Mr. FISHER. Do you consider that we had during the war practically a separate Air Service?

Col. ARNOLD. No, sir.

Mr. FISHER. Do you think, then, that the men conducting the Air Service during the war were hampered, and if so, in what regard; by lack of money?

Col. ARNOLD. By the Air Service during the war do you mean the Army Air Service?

Mr. FISHER. I mean the Army Air Service. I would not think you would be qualified as an expert to speak on the other.

Col. ARNOLD. You have been asking questions about all the Air Service.

Mr. FISHER. I will confine it specifically to the work of the aircraft board and the people who directed the Air Service of the Army.

Col. ARNOLD. The people who were conducting the Air Service in the Army were not hampered as far as I know, in any way.

Mr. FISHER. They had an abundance of money.

Col. ARNOLD. They had an abundance of money.

Mr. FISHER. And they were given full authority to carry out their plans?

Col. ARNOLD. In every way.

Mr. FISHER. Will you kindly state so that we may have the benefit of your expert testimony what else could have been done by a separate Air Service than was done by those who were in authority, unhampered, obviously unhampered, because their plans were accepted and approved by those in authority.

Col. ARNOLD. By a separate Air Service you are bringing in the Navy.

Mr. FISHER. I mean during the war, confining it to the work of the Army.

Col. ARNOLD. It may have been if they had had a separate Air Service it would not have been any more of a success than we had in the past war.

Mr. FISHER. Did we not practically have a separate Air Service, which was unhampered in their operations, and could a separate Air Service such as is proposed have done any more than that, so far as the Army is concerned?

Col. ARNOLD. Your big policy so far as the Army is concerned, is dictated, we will say, by the Chief of Staff and the Secretary of War. Your supply of machines was not dictated by the Secretary of War and the Chief of Staff; it was something absolutely independent. The Navy, on the other hand, was producing planes and producing material, and they were not under the Secretary of War or the Chief of Staff.

Mr. FISHER. Was that an economical basis you are figuring on now or a failure to economize?

Col. ARNOLD. I am figuring on the failure to economize, and in addition to that a failure to get the best results obtainable out of the material on hand.

Mr. FISHER. But the failure to economize may be eliminated because in no sense of the word was the policy of economy dominant because it was a question of production and saving lives.

Col. ARNOLD. I agree with that.

Mr. FISHER. Where was the Air Service of the Army hampered along the other lines, along the line of the producing of planes in this country? Was not that practically dictated by the American Expeditionary Forces? Were we not controlled in this country as to the type of plane and the production of planes by cablegrams from Gen. Pershing?

Col. ARNOLD. I should saw we were not, because the American Expeditionary Forces sent back, when the first De Haviland was sent there and said it was a failure and that certain changes were to have been made and should have been made before the plane was sent over there.

Mr. FISHER. You are not familiar with the famous cablegram that came over which caused the stopping of the manufacture of airplanes of a type on which millions of dollars had been spent?

Col. ARNOLD. I am probably more familiar with it than anybody else because it came to me.

Mr. FISHER. It came to you?

Col. ARNOLD. I was in charge of the development of personnel at that time.

Mr. FISHER. How many millions of dollars were spent in the building of airplanes which by that order were practically rendered useless?

Col. ARNOLD. I can not answer that because I did not handle funds at all during the war.

Mr. FISHER. But there were several millions of dollars expended in making airplanes which were rendered useless by that order?

Col. ARNOLD. There was just one type affected and that was the Spad.

Mr. FISHER. Give us an approximate estimate as to the amount of money involved by the stopping of the manufacture of airplanes by that order.

Col. ARNOLD. I have not any idea. I did not handle funds of any kind during the war.

Mr. FISHER. Certainly so far as that cablegram is concerned, the question of a separate air service had nothing to do with that.

Col. ARNOLD. A separate air service, so far as it relates to the American Expeditionary Forces, would relate to the method of operation on the other side. Where the Army operated here and the Navy operated here the Navy was doing work that should have been assigned to the Army and using planes that should have been used by the Army and there was no central control for the allotment of planes.

Mr. FISHER. Was it not a fact that by the time this country got into production of airplanes that the planes then developed were rendered obsolete by the progress made in the development of airplanes in Europe?

Col. ARNOLD. I would not say that; no.

Mr. FISHER. You do not think worth while considering the element of planes becoming obsolete?

Col. ARNOLD. The De Haviland plane was used up to the last of the war, and as far as performances was concerned I was told it was plenty good enough.

Mr. FISHER. Gen. Pershing testified before the Military Committees of the House and Senate, and my recollection of his testimony is that he differs very materially from what you have testified to. My understanding is that the question of a plane becoming obsolete was a material factor that caused him to send the cablegram.

Col. ARNOLD. You of course can get more competent testimony than mine regarding the question of planes becoming obsolete from the pilots who were actually flying them against the Germans, from their actual experience.

Mr. FISHER. The judgment of the pilots who were in the combat service in France had nothing to do with the judgment of the air service officers in France?

Col. ARNOLD. Oh, yes, undoubtedly. But I was not in France except merely as an observer.

Mr. FISHER. Have you an air service program in your mind that you would accept as final and as the best thing for the air service?

Col. ARNOLD. My idea——

Mr. FISHER (interposing). I would like to get from you details about that. I think the committee is practically agreed that we must have a separate air service. But nearly every witness has a different idea as to how the separate air service should be formed and how it should function. Could you give us your opinion as to whether or not you think we ought to have a Cabinet officer at the head of this proposed separate air service, and also give us some idea about personnel?

Col. ARNOLD. You are asking me to do a big job to answer that offhand.

Mr. FISHER. That is the job which the committee has. We have to determine whether or not we will have a separate air service, and we want to and ought to do everything possible to improve aviation and develop it. There does not seem to be any diversity of opinion about that. But when we enter into the field as to what kind of an air service we should have, we find the widest difference of opinion among officers.

Col. ARNOLD. I can give you an outline in a general way of what I think the air service should be, but when you come to the question of the number of officers and men that is something that will take months of study. So I shall not attempt to discuss that feature. It should be made up of a group of Army officers and Navy officers and civilians under one head.

Mr. FISHER. Do you think it is essential to have a Cabinet officer at the head of it?

Col. ARNOLD. It is a third method of fighting. In a recent report submitted by a board ordered by the Secretary of War, the statement is made that the Air Service alone will never win a war. That is one of the reasons sometimes given for not being in favor of a separate Air Service. But I make the same statement in regard to the Navy, that the Navy alone will never win a war.

Mr. FISHER. Then you think it is essential to the success of a separate Air Service to have a separate Cabinet officer at its head?

Col. ARNOLD. I think it is essential; yes,sir.

Mr. FISHER. And you think that unless we reach the conclusion that there should be a Cabinet officer at the head of the separate Air Service, any other steps in that direction would be in vain?

Col. ARNOLD. I would not say that. I do not see what department you would put it under if you do not have a separate Cabinet officer at the head of it.

Mr. FISHER. You have no definite plans, then, as to any other separate Air Service except a plan which includes having a Cabinet officer at the head of it?

Col. ARNOLD. No; I have not.

Mr. HULL. Colonel, you speak of a separate Air Service and a united Air Service. What we are all referring to is a united Air Service and not a separate Air Service; is that not true?

Col. ARNOLD. We want an Air Service in which all aviation activities are united under one control; yes, sir.

Mr. HULL. That is a united Air Service and not a separate Air Service.

Col. ARNOLD. I think you are probably using a better term.

Mr. HULL. We often hear witnesses speak of some case which is analogous to this. Is there any analogy in this proposed service to any other service? Is there any service in the world's history that is analogous to the present condition of the Air Service that confronts anybody that has anything to do with it?

Col. ARNOLD. I do not know of any, but I was always taught to believe that the development of the British navy and the merchant marine went hand in hand; that the British put their merchant marine under the navy so that the actual control of ships came under their navy. And in order to produce an efficient navy in time of war they subsidized the merchant marine.

Mr. HULL. That is true to a certain extent, but it is not analogous in this, that the Air Service in itself is fundamentally different because you can not establish a base for operations for the Air Service; is that not true?

Col. ARNOLD. That is true.

Mr. HULL. Then the whole foundation is swept away and you have no analogy. What we have to face is something absolutely new.

Col. ARNOLD. You have to start entirely new. There is no absolute analogy.

Mr. HULL. We have no experience to go on, is that not true?

Col. ARNOLD. A very limited experience.

Mr. HULL. All that we have we have gotten within the last 10 or 12 years. It is experimental; no government has made a success of it.

Col. ARNOLD. Not an unqualified success as yet.

Mr. HULL. There is not any government operating it as you would operate it?

Col. ARNOLD. I do not think there is any absolutely successful air service running. The nearest approach to it is the British air service.

Mr. HULL. And that has fallen down, according to their own newspapers?

Col. ARNOLD. It is like everything else; it depends on whom you ask about it.

Mr. HULL. As a matter of fact, we know nothing about it except——

Col. ARNOLD (interposing). We do know this, that the British air service to-day is in better condition than the one we have in the

United States now. They have a definite policy for the development of aircraft for the future, which we have not.

Mr. HULL. You say that, but yet on yesterday we had high naval officials before the committee who denied that. So where are we?

Col. ARNOLD. As I said before, it is according to what your point of view is.

Mr. HULL. You will admit this, will you not, that the Navy was more successful—I will not say it was completely successful—but they were more successful in the war than the Army, so far as airplanes were concerned?

Col. ARNOLD. The mistakes made by the Navy were not aired as much as those made by the Army.

Mr. HULL. They were not so big.

Col. ARNOLD. The Army had a bigger airplane problem.

Mr. HULL. They did produce and get planes, and they are producing and getting planes today?

Col. ARNOLD. Yes. We produced a lot of De Havilands, too.

Mr. HULL. But you did not produce any single seaters yourselves at all?

Col. ARNOLD. No. That was not our policy. We got a lot of De Havilands.

Mr. HULL. But they were not a success?

Col. ARNOLD. I would like to find out whether the Navy planes were an entire success.

Mr. HULL. They tell us they were. You know this, do you not, as a general proposition, that the Navy are satisfied with their own service and they object to having any united air service under which control will be taken away from the Navy; you know that?

Col. ARNOLD. Yes, sir; I know that.

Mr. LAGUARDIA. That is the naval higher command, not the naval flyers?

Mr. HULL. The higher command.

Mr. LAGUARDIA. Not the naval air men.

Mr. HULL. Would you not advise us, as a committee of Congress, to go rather slowly in disturbing something which has worked fairly satisfactorily; and would you advise us to plunge into it and say we will turn it over to the Army, when they have failed?

Col. ARNOLD. You have heard more testimony on this subject than I have and know more about it, and you have at your disposal details of data that I have not.

Mr. HULL. Certainly we have.

Col. ARNOLD. From my point of view, it looks as if the Army and Navy Air Services in the future are going to be so small compared with the big commercial aviation that what Army officers and Navy officers say about aviation in its larger aspect will not amount to anything.

Mr. HULL. That brings up an interesting question. You evidently are one of those who believe in the immediate commercial progress of the airplane?

Col. ARNOLD. I do.

Mr. HULL. Do you know that you are not in line with the best thought in this country in regard to that?

Col. ARNOLD. I probably am not.

Mr. HULL. In what way do you think commercial aviation will be a success?

Col. ARNOLD. Right at the present time—I am from California. We have 360 sunshiny days in the year. There is a commercial firm now with enough business booked ahead to establish commercial lines between San Francisco and Los Angeles and San Francisco and Reno, Nev., so that they could make 33⅓ per cent on their money if they have the planes with which to establish the lines.

Mr. HULL. Can they not get the planes?

Col. ARNOLD. They can not get the planes and they are not willing to go into that proposition without knowing what the United States Government is going to do toward regulating the use of airplanes and in regard to the qualifications of pilots.

Mr. HULL. Then, if we could clear that up——

Col. ARNOLD (interposing). You would start at least one company.

Mr. LAGUARDIA. That you know of?

Col. ARNOLD. That I know of.

Mr. HULL. You say there is a company which claims that it can make 33⅓ per cent if it could get the planes and be certain of the rules and regulations under which they would have to operate?

Col. ARNOLD. Yes, sir. I do.

Mr. HULL. What would they carry?

Col. ARNOLD. They would carry passengers. They have already been in communication with the White House, and they have an agreement or understanding with the Associated Oil Co. whereby they can establish land stations, and they have sufficient business in prospect so that they can make 33⅓ per cent on their money.

Mr. HULL. If we were to create an agency that would take over aviation activities of the Government and lay down rules by which aviation should be conducted, as far as routes are concerned, and rules of the air, we should have taken one step?

Col. ARNOLD. That would be a step in the right direction. At the present time these people all come to me because I am the Government representative in aviation out there and ask me what to do, and I am telling them that I am simply an Army officer and I have no authority to do anything for them, and I can not give them any definite information.

Mr. LAGUARDIA. Nor have you any available technical information gathered by the various bureaus to give these people?

Col. ARNOLD. No.

Mr. HULL. Your idea about curing the situation is to create a united Air Service that would take aviation activities out of the Army and the Navy and put under one head a branch of the Army and the Navy that at the present time looks to a great many of us as though it was auxiliary to the Army and the Navy.

Col. ARNOLD. It has been considered auxiliary to the Army and the Navy to such an extent that in the program for the future development in the Army they consider that you can train an aviator in the same time that you can train an infantry officer, and you know and I know it can not be done.

Mr. HULL. If we were to do that, we would run counter to the high naval officials; you know that?

Col. ARNOLD. Surely.

Mr. HULL. And really run counter to the high Army officials?

Col. ARNOLD. Yes, sir; you would.

Mr. HULL. Have you read the bills pending before Congress on this subject?

Col. ARNOLD. I have read them over; yes, sir.

Mr. HULL. You know how far they go?

Col. ARNOLD. In a general way. I have not made a study of them that I would have made if I were here directing the policy concerning aviation. Since I have been out in San Francisco my job has been a small job in a limited way, and from time to time I have seen quotations from the New bill and the Curry bill, but I have not made a study of the particular bills that I would have made had I known I was coming here to testify on this matter.

Mr. HULL. Did you know I had introduced a bill on the subject?

Col. ARNOLD. I did not know that; no, sir.

Mr. HULL. If we create a separate air service with a director of aeronautics at the head of it and give him authority over production, engineering, and research work, leaving the personnel up to the Army and Navy, but having this department of aeronautics, not creating a Cabinet position, but making it a separate executive department with full authority to lay lown rules, coordinating the different branches of the Government in so far as research, engineering, and production go and let the Army and the Navy attend to the matter of personnel, as they are doing at present, letting this department work out the problem as to how far they can go, do you not think it would be a better business proposition, so far as this committee is concerned, than to attempt to take the whole thing over in one step?

Col. ARNOLD. I do not think I am qualified to answer that question, because I do not know enough about the details.

Mr. HULL. But you live in the atmosphere of the Air Service and you ought to have an opinion on the matter.

Col. ARNOLD. I see it from my point of view. I see that aviation is not developing here. I see that the only place where aviation is developing is in England. They are developing a separate air service under an air department and are developing commercial aviation, who in turn are developing machines which will later be used by the army and the navy.

Mr. HULL. You say in England they have a separate air service. By that you mean they have a united air service?

Col. ARNOLD. They have a united air service.

Mr. HULL. As you would have it in this country?

Col. ARNOLD. Exactly.

Mr. HULL. They do not have a united air service operated separately from the army and the navy?

Col. ARNOLD. They turn it over to the army and the navy for their use and training, as I would do.

Mr. HULL. And the army and navy really dictate the policy of operations?

Mr. LAGUARDIA. Of a particular operation at a particular time.

Mr. HULL. They really dictate in the matter of personnel, do they not?

Col. ARNOLD. The personnel comes from a big pool in the united air service.

Mr. HULL. And the separate air service controls it?

Col. ARNOLD. They control it until it goes under the army or the navy.

Mr. HULL. It is working successfully?

Col. ARNOLD. To the best of my knowledge it is.

Mr. HULL. Then why is there so much criticism of it?

Col. ARNOLD. It all depends on whom you ask about it. I notice in a statement made by Winston Churchill that he says the British Air Ministry, although not perfection, is the best plan for developing it. He says it is developed on the basis of actual war experience, and there is no possibility of England reverting to the prewar organization.

Mr. HULL. That was in direct answer to the criticism of that very service by experts, and he was defending his administration. You realize that, do you not?

Col. ARNOLD. This is my idea on the subject, that Mr. Churchill made the statement——

Mr. HULL (interposing). Do you suppose if you went down and asked the Secretary of War for his advice he would not write practically the same thing about the Army Air Service as at present constituted?

Mr. CALDWELL. That is not a fair question. This witness is an Army officer, and it is not fair to ask him that question. You might make that as your own statement.

Mr. HULL. I simply call attention to the fact that the Secretary of War would say the same thing, and that would not convince anybody. You speak of the Dayton-Wright plant. You have been there?

Col. ARNOLD. I have been there; yes, sir.

Mr. HULL. You do not want to give us any suggestion in regard to the purchase of that plant, as I understand it. That matter is up to-day in the House.

Col. ARNOLD. My thought was in reference to the question of your policy. I do not know your policy, but if the policy is to develop a large experimental station at Dayton, by all means it should be purchased.

Mr. HULL. It is better than not having one.

Col. ARNOLD. If you are going to have one in connection with land planes; but they could not develop a hydroplane.

Mr. HULL. How about the North Elmwood plant at Buffalo, the Curtiss plant?

Col. ARNOLD. You would spend more money—purchase for what purpose?

Mr. HULL. There you would purchase a great manufacturing and storage plant which probably could be converted into an engineering plant.

Mr. LAGUARDIA. We are purchasing a building, a factory that is being used for storage now.

Col. ARNOLD. I am against purchasing anything just for the sake of purchasing.

Mr. LAGUARDIA. Just for the sake of giving a sum of money to the owners of the plant.

Col. ARNOLD. During the war we purchased no motor factories, but we produced a number of motors. I am against purchasing

simply for the sake of purchasing. We must look for its future utilization to fulfill the possibility of usages to which it may be subjected.

Mr. HULL. You say the Dayton-Wright plant could not develop a hydroplane?

Col. ARNOLD. No, sir.

Mr. HULL. Could the plant at Buffalo?

Col. ARNOLD. The one at Buffalo and the one at Dayton-Wright are similar to that extent.

Mr. HULL. Could you not build a hydroplane at Buffalo? The plant is right near Lake Erie.

Col. ARNOLD. You would still have to ship it to the water.

Mr. HULL. You do not think it could be developed there any more than at Dayton?

Col. ARNOLD. If you are just going to have an Army experimental plant I do not think you would do any better than to take the Dayton-Wright plant because it is completely equipped and has a good building, and they have a testing field right outside of their doors.

Mr. HULL. You say you got the cablegram from Gen. Pershing?

Col. ARNOLD. All those cablegrams came through me, or I got copies of them because they affected training. I was in charge of training. I have nothing to do with the production of machines at all.

Mr. HULL. According to your story, when you spoke of the personnel in the Air Service you said there were more butchers than experts. That was purely an administrative matter?

Col. ARNOLD. It was an administrative policy.

Mr. OLNEY. I think there is a well-defined policy in the minds of the members of the committee for a united air force, including the Army, the Navy, the Geodetic Survey, the Department of the Interior, the Forest Patrol and other activities, each to have its separate operations. I am sure you approve of such a plan as that.

I was interested in your testimony in reference to the various committees or boards, on three of which you served and on another of which you sat in, which exemplified the fact that there was no united air force during the war, but it was perhaps best represented by the Aircraft Board which only acquired material and contracted for machines and material and really only had recommending power. There was no final authority in that board, and for that reason there perhaps were not teeth enough in the law. But in this bill which we propose to write there will be a united air service.

The reason you were asked about having a Cabinet officer at the head of this service was that we know that on the part of the administration there is a tendency to disapprove the creation of a new Cabinet position. In one of the bills there is a provision for an aircraft board with sufficient power so that it would accomplish the same results as would be accomplished by having the head of the service as a Cabinet officer.

Col. ARNOLD. The mere matter of names means nothing; it is the idea that counts. If the department head has the authority to fulfill your intentions, he does not necessarily have to be a secretary.

Mr. OLNEY. There is no doubt in our minds that commercial aviation would be encouraged through the appointment of an aircraft board having its subdivisions operating in cooperation and securing

coordination which apparently did not exist during the war when the Army and the Navy were not coordinating.

Mr. LAGUARDIA. At this time, if there is no objection, I will put in the record the act creating the Aircraft Board and the decision by the Acting Judge Advocate General holding that this board had only advisory powers, and also a letter from the Chief Signal officer to the Adjutant General of the Army in reference to the duties of the Aircraft Board.

(The matter referred to is as follows:)

ACT CREATING AIRCRAFT BOARD.

[PUBLIC—No. 48—65TH CONGRESS.]

[S. 2705.]

AN ACT To create the Aircraft Board and provide for its maintenance.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of expanding and coordinating the industrial activities relating to aircraft, or parts of aircraft, produced for any purpose in the United States, and to facilitate generally the development of air service, a board is hereby created, to be known as the Aircraft Board, hereinafter referred to as the board.

SEC. 2. That the board shall number not more than nine in all, and shall include a civilian chairman, the Chief Signal Officer of the Army, and two other officers of the Army, to be appointed by the Secretary of War; the Chief Constructor of the Navy and two other officers of the Navy, to be appointed by the Secretary of the Navy; and two additional civilian members. The chairman and civilian members shall be appointed by the President, by and with the advice and consent of the Senate.

SEC. 3. That said board and tenure of office of the members thereof shall continue during the pleasure of the President, but not longer than six months after the present war. The civilian members of the board shall serve without compensation.

SEC. 4. That the board is hereby empowered, under the direction and control of and as authorized by the Secretary of War and the Secretary of the Navy, respectively, on behalf of the Departments of War and Navy, to supervise and direct, in accordance with the requirements prescribed or approved by the respective departments, the purchase, production, and manufacture of aircraft, engines, and all ordnance and instruments used in connection therewith, and accessories and materials therefor, including the purchase, lease, acquisition, or construction of plants for the manufacture of aircraft, engines, and accessories: *Provided*, That the board may make recommendations as to contracts and their distribution in connection with the foregoing, but every contract shall be made by the already constituted authorities of the respective departments.

SEC. 5. That the board is also empowered to employ, either in the District of Columbia or elsewhere, such clerks and other employees as may be necessary to the conduct of its business, including such technical experts and advisers as may be found necessary, and to fix their salaries. Such salaries shall conform to those usuall paid by the Government for similar service: *Provided*, That by unanimous approval of the board higher compensation may be paid to technical experts and advisers. The board may rent suitable offices in the District of Columbia or elsewhere, purchase necessary office equipment and supplies, including scientific publications and printing, and may incur necessary administrative and contingent expenses, and for all of the expenses enumerated in this paragraph there shall be allotted by the Chief Signal Officer of the Army for the fiscal year nineteen hundred and seventeen and nineteen hundred and eighteen the sum of $100,000, or so much thereof as may be necessary, from any appropriation now existing for or hereinafter made to the Signal Corps of the Army, and such appropriation is hereby made available for these purposes: *Provided further*, That except upon the joint and concurrent approval

of the Secretary of War and the Secretary of the Navy there shall not be established or maintained under the board any office or organization duplicating or replacing, in whole or in part, any office or organization now existing that can be properly established or maintained by appropriations made for or available for the military or naval services. *Provided further*, That a report shall be made to Congress on the first day of each regular session of the salaries paid from this appropriation to clerks and employees by grades, and the number in each such grade.

Approved, October 1, 1917.

DEFINITION OF FUNCTIONS OF AIRCRAFT BOARD.

WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL OFFICER,
Washington, February 25, 1918.

From: Office Chief Signal Officer.
To: The Adjutant General of the Army.
Subject: Duties of Aircraft Board.

1. The act approved October 1, 1917 (Public, No. 48, 65th Cong.) created the Aircraft Board. On February 14, 1918, the Judge Advocate General stated that it is the opinion of that office that only advisory or recommendatory functions with reference to the making and distribution of contracts and the purchase, production, and manufacture of aircraft, engines, and all ordnance and instruments used in connection therewith, and accessories and material therefor, including the purchase, lease, acquisition for construction of plants for the manufacture of aircraft engines and accessories may be conferred upon the Aircraft Board.

2. In order to define the duties of the Signal Corps and the Aircraft Board with respect to the matters mentioned in paragraph 1 hereof, it is recommended that the president of the Aircraft Board be informed that the War Department understands that the board's activities in such matters will be as follows:

(*a*) To act as a clearing house between the General Staff and the Signal Corps for all matters pertaining to raw materials for foreign governments for the production of aircraft, the Equipment Division of the Signal Corps to act as purchasing agency.

(*b*) To act as a clearing house between the General Staff and the Signal Corps for all information in relation to requirements of foreign governments for aircraft to be manufactured in the United States.

(*c*) To act as a clearing house for all information as to requirements as between the Army and Navy for aircraft and raw materials.

(*d*) To study the requirements of the Army and Navy as regards combat and training planes. To study types with the technical divisions of the Army and Navy to the end that recommendations be made that given types be placed with industrial plants best fitted to undertake their manufacture. The Aircraft Board shall have no direct communication with manufacturing plants, except through the medium of the procurement divisions.

(*e*) As a result of above studies the Aircraft Board may recommend that preparations be made for production before actual contracts are made.

(*f*) To recommend the placing of experimental contract.

(*g*) All programs should be made up by the board from information which shall be furnished by the proper Army and Navy military and naval branches on the one hand and the equipment and production divisions of the Army and Navy on the other. All foreign cables respecting aircraft production should be cleared through the board.

(*h*) The Aircraft Board should be the instrumentality through which contact is made on matters of large policy with other bodies, such as Shipping Board allied representatives, etc.

GEORGE O. SQUIER,
Major General, Chief Signal Officer of the Army.

Approved: (February 25, 1918).

BAKER.

Approved so far as applicable to production of aircraft for Navy Department.

JOSEPHUS DANIELS.

DEFINING LEGAL STATUS OF AIRCRAFT BOARD—CONSTRUCTION OF ACT CREATING AIRCRAFT BOARD.

THE AIRCRAFT BOARD,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, D. C., February 14, 1918.

1. By a communication of February 11 the opinion of this office is requested on the construction of the act of October 1, 1917, creating the Aircraft Board (Public, No. 48, 65th Congress), concerning the powers and responsibilities of the board particularly with reference to whether their powers are executive or advisory.

2. The act of October 1, 1917, providing for the creation of such board, makes the grant of powers thereto in sections 4 and 5. Section 5 makes a direct grant of power to organize, to employ the necessary personnel, and to secure the necessary quarters. The only limitations thereon are those imposed by the appropriation and by the proviso that, without the joint and concurrent approval of the Secretary of War and the Secretary of the Navy, there shall not be established or maintained under the board any office or organization duplicating or replacing, in whole or in part, any office or organization now existing that can be properly established or maintained by appropriations made for, or available for, the military or naval services.

Section 4 reads as follows: "That the board is hereby empowered, under the direction and control of and as authorized by the Secretary of War and the Secretary of the Navy, respectively, on behalf of the Departments of War and Navy, to supervise and direct, in accordance with the requirements prescribed or approved by the respective departments, the purchase, production, and manufacture of aircraft, engines, and all ordnance and instruments used in connection therewith, and accessories and materials therefor, including the purchase, lease, acquisition, or construction of plants for the manufacture of aircraft, engines, and accessories: *Provided*, That the board may make recommendations as to contracts and their distribution in connection with the foregoing, but every contract shall be made by the already constituted authorities of the respective departments."

It will be noted that Congress in said section 4, confers no power directly upon the Aircraft Board, but empowers the Secretary of War and Secretary of the Navy to authorize said board to do certain things under the control and direction of the respective secretaries and in accordance with the requirements prescribed or approved by the respective departments. Furthermore, due consideration of the limitations set forth in the proviso, in the light of the present system of control over the execution of contracts by the contracting officers who made them, and due regard for the purpose of the entire act as expressed in the first section thereof, require the words, "supervise and direct" to be construed as contemplating only advisory or recommendatory functions with reference not only to the making and distribution of contracts but also reference to the purchase, production and manufacture of aircraft, engines, and all ordnance and instruments used in connection therewith, and accessories and materials therefor, including the purchase, lease, requisition or construction of plants for the manufacture of aircraft, engines and accessories. This office therefore concurs with counsel for the Aircraft Board in the opinion that only advisory functions with reference to those matters may be conferred upon the Aircraft Board.

S. T. ANSELL,
Acting Judge Advocate General.

STATEMENT OF MR. JAMES A. MEISSNER, BIRMINGHAM, ALA.

Mr. LAGUARDIA. Gentlemen, we have here to appear before the committee to-day the flower of the American Air Service, men who did hard fighting in the air on the other side. We have brought them before the committee to show you the viewpoint of these men who have been through the fighting, and who will give you any information you want as to how much freedom of action the fighting air force should have in actual operations. That is the purpose of having them appear before the committee, and we will request the

members of the committee to confine their questions to that point. These young men are not experts on legislation, and they particularly expressed the desire not to be questioned on any of the errors of the past, because they were on the other side at the time. Their specialty is actual air operations against the enemy, as evolved by the past war.

I will ask Maj. Meissner to testify first.

What is your name and address?

Mr. MEISSNER. James A. Meissner; my address is the Y. M. C. A., Birmingham, Ala.

Mr. LAGUARDIA. You served in the Air Service during the war?

Mr. MEISSNER. Yes.

Mr. LAGUARDIA. Where were you stationed?

Mr. MEISSNER. At Chateau-Thierry and in the Argonne.

Mr. LAGUARDIA. Where did you receive your flying training?

Mr. MEISSNER. At Tours.

Mr. LAGUARDIA. You attended a ground school here?

Mr. MEISSNER. At Cornell.

Mr. LAGUARDIA. You received all your flying instruction overseas?

Mr. MEISSNER. Yes.

Mr. LAGUARDIA. What were you flying?

Mr. MEISSNER. Caudrons and Nieuports.

Mr. LAGUARDIA. Fighting in Nieuports?

Mr. MEISSNER. In Nieuport 28's and then in Spads.

Mr. LAGUARDIA. In what organizations?

Mr. MEISSNER. First in the 94th Squadron and then in the 147th Squadron.

Mr. LAGUARDIA. What squadron did you command?

Mr. MEISSNER. I commanded the 147th Squadron.

Mr. LAGUARDIA. When did you get to the front?

Mr. MEISSNER. At the end of February, 1918, and began operations in the middle of April.

Mr. LAGUARDIA. You are an ace?

Mr. MEISSNER. Yes.

Mr. LAGUARDIA. How many planes have you to your credit?

Mr. MEISSNER. I have eight, officially.

Mr. LAGUARDIA. Major, judging from your experience, do you believe a fighting air force can be better and more efficiently developed in this country by a united air service than by having the air services separate.

Mr. MEISNER. I do; very firmly.

Mr. LAGUARDIA. Do you believe that the pursuit work, which is the fighting in the air in order to make observation and bombing possible, should be conducted under the general command of the commander of operations, but should have its own air force commander?

Mr. MEISSNER. I do; yes.

Mr. LAGUARDIA. Did you not practically operate that way at the front?

Mr. MEISSNER. We did.

Mr. LAGUARDIA. The only orders your squadrons would receive from the land forces would be that certain operations would be

carried on and that certain observation was desirable and necessary?

Mr. MEISSNER. I do not know about observation, but I know about the patrol work.

Mr. LAGUARDIA. So you would choose your own time?

Mr. MEISSNER. That would be determined by the group commander.

Mr. LAGUARDIA. The group commander of aviation?

Mr. MEISSNER. Yes.

Mr. LAGUARDIA. And the tactics were entirely a matter of the air force?

Mr. MEISSNER. That was usually determined at a meeting of the group commander with the squadron commanders every morning.

Mr. LAGUARDIA. And that worked out all right?

Mr. MEISSNER. Very well.

Mr. LAGUARDIA. The matter of supplies is of extreme importance to the efficiency of a fighting group?

Mr. MEISSNER. It is.

Mr. LAGUARDIA. You must have the facilities for repairs, and must have the planes and the spares at all times?

Mr. MEISSNER. Yes.

Mr. LAGUARDIA. That is a matter which is peculiarly one of aviation?

Mr. MEISSNER. Entirely so.

Mr. LAGUARDIA. You would not want an untrained quartermaster officer to handle that?

Mr. MEISSNER. It ought to be handled by especially trained personnel who must know aviation.

Mr. LAGUARDIA. Unless you have a perfectly working service of supplies in the rear your pursuit work is helpless at the front.

Mr. MEISSNER. It is; because you can not keep planes in the air.

Mr. LAGUARDIA. Do you believe that in future wars aviation will play an important part?

Mr. MEISSNER. It will play the most important part.

Mr. LAGUARDIA. Is it not true that no army would dare to advance unless it was sure of its air forces?

Mr. MEISSNER. It would be unable to advance if the enemy had a sufficient air force.

Mr. LAGUARDIA. So that the first engagement would be a fight in the air, to gain supremacy of the air?

Mr. MEISSNER. Yes.

Mr. LAGUARDIA. That would be followed up by an attack on the line of communications of the enemy forces and an advance of the land troops?

Mr. MEISSNER. Yes, sir. The outstanding fact of the war was that a new combatant force had been born, and as not only in this war but in the future it must be reckoned with—there is no camouflage to air supremacy—the Nation must have it absolutely in order to be prepared. In my mind, air supremacy consists of superior planes, superior numbers, superior personnel, and the machinery to act quickly en masse.

STATEMENT OF CAPT. FIELD E. KINDLEY, AIR SERVICE.

Mr. LaGuardia. What is your address, Captain?
Capt. Kindley. Mineola, Long Island.
Mr. LaGuardia. How many Huns did you shoot down?
Capt. Kindley. Twelve, officially, according to the latest records.
Mr. LaGuardia. Are you still in the service?
Capt. Kindley. Yes.
Mr. LaGuardia. Where are you assigned to duty?
Capt. Kindley. At Mitchell Field.
Mr. LaGuardia. What are your duties there?
Capt. Kindley. Instruction.
Mr. LaGuardia. Are you a Regular Army officer?
Capt. Kindley. Temporary.
Mr. LaGuardia. About when did you enter the service?
Capt. Kindley. April, 1917.
Mr. LaGuardia. Where were you trained as a pilot?
Capt. Kindley. In England.
Mr. LaGuardia. And you received your ground-school training here?
Capt. Kindley. Yes; at Champaign, Ill.
Mr. LaGuardia. After you finished your training in England you were assigned to an English squadron?
Capt. Kindley. Yes, sir.
Mr. LaGuardia. How long did you fly in an English squadron?
Capt. Kindley. About six months.
Mr. LaGuardia. Then you went with one of our squadrons?
Capt. Kindley. With the One hundred and forty-eighth.
Mr. LaGuardia. And you finished the war with the One hundred and forty-eighth?
Capt. Kindley. Yes.
Mr. LaGuardia. That was in pursuit work?
Capt. Kindley. Yes, sir.
Mr. LaGuardia. What planes did you fly with the English squadron?
Capt. Kindley. The Morse, the Formand, the Giant Sopwith, the Baby Sopwith, and the Camel.
Mr. LaGuardia. All good planes?
Capt. Kindley. Every one of them.
Mr. LaGuardia. When you were with our squadrons, what American planes did you fly?
Capt. Kindley. I never flew an American machine.
Mr. LaGuardia. Did you have English machines in the One hundred and forty-eighth Squadron?
Capt. Kindley. Yes, sir.
Mr. LaGuardia. What did you have?
Capt. Kindley. Sopwiths and Camels.
Mr. LaGuardia. Are you an ace?
Capt. Kindley. Yes, sir.
Mr. LaGuardia. Will you give the committee your views along the line developed by the testimony of Maj. Meissner as to the desirability of having a united Air Service and the necessity of prompt action in observation?

Capt. KINDLEY. I think it is a decided fact that aviation should be combined; that the Army and Navy are, instead of cooperating with each other, in one sense of the word bucking each other, and twice as much money being spent where one-half the amount would serve the same purpose if the Army and Navy and other governmental branches of aviation were under one head.

The reason aviation should be under one head is, that if we are going to have a naval war, then the Air Service can be assigned to the Navy; if we have an Army war—that is, a ground war—then the Air Service can be assigned to the Army and used by it.

In the last war the Navy had a good Air Service and the Army had, as far as it was permitted to have. But at the same time the Navy had no opportunity to prove what it could do, because it was under the direction of the Navy, and ,inasmuch as the Navy had not much to do in the last war, they were practically idle.

This was also true of the British Naval Air Service until there was a consolidation. As soon as the British Army and Navy Air Services were consolidated on the front we noticed at once, within a week, that naval aviators were being sent to the front line for the use of the Army. If you would question these naval aviators as to what they had been doing in the past, they would tell you practically nothing. Of course, they had been patrolling the coast to a certain extent in connection with naval work, but as far as fighting the Hun was concerned they had not any chance to do that. As soon as the Army and the Navy Air Services were consolidated the ships they were using were brought to the front to strengthen it all the way round.

So far as a separate air service is concerned, my opinion is that everything that goes into the air should be under one head, known as a combined air service. It should be that way in time of peace because as soon as war is declared everything that goes into the air can then be used by the united air service at the place needed. In order to have a proper check on it, it is necessary to have a complete inventory of all aircraft in the whole United States.

The Air Service at the present time is in its infancy. In the future we will have so much aviation that it is going to be necessary for us to patrol the air just as we patrol the border. We have got to patrol the air to prevent smuggling and we have got to patrol the air to prevent information from leaking out. We will have to patrol every portion of the United States, and that is too big a job for either the Army or the Navy alone to undertake.

Mr. LAGUARDIA. Captain, it would also be very useful, would it not, if we were to keep a large number of men flying at all times?

Capt. KINDLEY. It is absolutely necessary.

Mr. LAGUARDIA. And the best way to make a flier is to let him fly?

Capt. KINDLEY. It is the only way to make one and keep one.

Mr. LAGUARDIA. So if we were to develop a large aerial postal service in different parts of the country, and if we were to carry on as many aerial activities as we can, such as the Postal Service, forest patrol, Coast Guard patrol, and the like, it would be a very easy matter to turn these men into fighting pilots if an emergency arose?

Capt. KINDLEY. Yes. In fact, we should beg for the opportunity of doing that. At the present time we are patrolling the coast. We have a patrol which leaves Mitchel Field and patrols to Langley Field. They do nothing except observe the coast. It would be very easy for them at the same time to carry mail.

Mr. LAGUARDIA. To do something useful?

Capt. KINDLEY. Not necessarily useful, because patrolling the coast is useful in itself. You can combine the two. There is no use in having a special train, for instance, running along the line for the purpose of observing the line, and then have another train following it up for the purpose of carrying material. The same thing is true in connection with the operations of the Coast and Geodetic Survey.

Mr. LAGUARDIA. And the best we can do now is to send a man up to make a few circles over the field?

Capt. KINDLEY. It is necessary by law that the pilot have four hours' flying a month to keep his flying up.

Mr. LAGUARDIA. And that is not enough to keep him in good flying training?

Capt. KINDLEY. No, that is not enough, but the condition of the Air Service will not permit more than that.

Mr. LAGUARDIA. That is not taking into consideration the fifteen thousand and odd men who are now out of the service and going to rust?

Capt. KINDLEY. They have rusted out; they are not going to rust. They will have to be trained all over again.

Mr. LAGUARDIA. There is no difference in the training of a pilot if he is to fly in a machine, whether he wears a army or a navy uniform.

Capt. KINDLEY. There is absolutely none.

Mr. LAGUARDIA. You are familiar with the northern bombing project of the American Navy in France?

Capt. KINDLEY. Yes.

Mr. LAGUARDIA. They used land machines?

Capt. KINDLEY. Yes, sir.

Mr. LAGUARDIA. That was really a land operation?

Capt. KINDLEY. It was.

Mr. LAGUARDIA. There is no difference in flying whether you are flying over water or over land?

Capt. KINDLEY. There is none. In France we did some of the Navy work, or what was supposedly the Navy's work, before the consolidation was made, in giving protection for bombers over Zeebruge and Bruges. After that we flew over water, and our training in land flying did not disqualify us for that work.

Mr. LAGUARDIA. You are in accord, I take it, with Maj. Meissner's view that it is necessary to have prompt action in operation to carry on the work properly?

Capt. KINDLEY. It is absolutely necessary.

Mr. LAGUARDIA. And, of course, the air force would be under the command of the senior line officer conducting the operations?

Capt. KINDLEY. Yes, sir.

Mr. LAGUARDIA. As to its own movement, it should have autonomy of action?

Capt. KINDLEY. Yes. If we should go to war with England, for instance, they have a separate air service, and what they would hold

in their mind would be to cause our air service to be destroyed, and we have to hold that in our minds. If the Navy goes to war, the Navy has in mind the naval bases of the enemy, which we must destroy.

It is possible in the next war, as has been suggested, that the first battle will be in the air. We do not know where it will be. It may be 25 or 50 miles or 200 miles inside the enemy's lines, or it may be just the other way—it may be inside of our lines. If war was declared now it would probably be that way. If a battle in the air is carried on 200 miles away from the Navy or the Army, it is decidedly up to the Air Service to carry that out.

Mr. LAGUARDIA. And following the air battle the successful side would immediately proceed to the destruction of the line of communication, and then troops would advance, but not until then?

Capt. KINDLEY. Not until then; it would not be safe.

Mr. HULL. Of course, these gentlemen are giving us good testimony, but some of the statements they make we might take exception to. But to carry out such a line of questioning would take quite a good deal of time, and I would rather listen to the witnesses than to hear myself talk.

STATEMENT OF MR. CHARLES J. BIDDLE, OF PHILADELPHIA, PA.

Mr. LAGUARDIA. What is your name and address?

Mr. BIDDLE. Charles J. Biddle, 505 Chestnut Street, Philadelphia, Pa.

Mr. LAGUARDIA. What is your present business?

Mr. BIDDLE. Attorney at law.

Mr. LAGUARDIA. You served in the last war? With what rank?

Mr. BIDDLE. I did. As a major of Air Service.

Mr. LAGUARDIA. How long were you in the service?

Mr. BIDDLE. I enlisted in the French Army in March, 1917. I trained at the French schools at Avoir and Villaneauve, and I went to the front at the end of July, 1917, in French group 12, squadron 73. We were flying the Spad machines. I stayed there with the French until January. I was then transferred to the American service and served with the Lafayette squadron, and shortly after that spent a couple of months in the hospital, and then took command of the 13th Air Squadron and commanded that before and during the St. Mihiel and Argonne offensives, until toward the end of October, when I commanded the 17th group, which consisted of the 13th, the 140th, and the 141st squadrons.

Mr. LAGUARDIA. Are you an ace?

Mr. BIDDLE. Yes.

Mr. LAGUARDIA. How many machines have you to your credit?

Mr. BIDDLE. I have seven, officially.

Mr. LAGUARDIA. We would like to have a statement from you as to how a properly organized united air service would develop aviation in this country and how it would serve to give us an efficient fighting air force in time of emergency.

Mr. BIDDLE. To begin with, I entirely agree with the first part of Col. Arnold's remarks about the advantage of a united air service in regard to the increased efficiency and the cutting down of expense, and all that sort of thing, which he went into.

To take advantage of it first in real war service it is very important, I think, to have a united air service and to have all branches of the air service under one group or head, and to have the antiaircraft artillery under the same command as the air service—not as a part of the artillery. The cooperation between the American antiaircraft artillery and the Air Service was very poor; it was not as good as the French, and it was not as good as the British, and they all, I think, could be greatly improved. That is one of the most important things if you are going to have efficient work on the front not only behind the observation planes but also the pursuit planes.

Another thing is this: A question was asked as to whether it was thought, if we had had in the past war a united air service we would have gotten along any better than we did. Of course, if you are going to have a united air service and have it operate properly you have to start out ahead of time. That is one of the main reasons why it should be put into effect now. It takes a long time to create an efficient air service, but it does not require so long to develop and train pilots. A pilot should be thoroughly trained in six months under favorable weather conditions. So far as the production of machines is concerned, that is different. Also, it takes a lot of time to get an efficient higher command which understands the work on the front. If you had that more efficiently trained command you would get away from some of the situations we had in France.

For instance, our field during the Argonne offensive was 30 miles from the lines. We were a pursuit unit with the second pursuit group. We flew only in the day time, because we had no landing facilities for landing at night. It took 20 minutes to get to the lines and 20 minutes to get back. Several times we were ordered, when there was only half an hour of daylight left, to leave the ground and bomb behind the lines or to protect bombers some 10 miles on the other side of the German line. It would have taken us 20 minutes to get to the line and 20 minutes to get back, which was 40 minutes, aside from the time it took to get together and get over the lines and back again. The result was it was utterly impossible to do the work properly, and some of the planes came back in the dark and were smashed up.

On other occasions, in weather which was utterly impossible to fly in, we were sent out and went up 10,000 feet, with nothing accomplished, no German machines were seen and the pilots got lost, landing everywhere and smashing up machines. Then, the next day would be a beautiful, clear day, and the Germans would have conserved their forces, and we would not have enough machines to meet them, and we would get frantic calls from the front that there were German machines here or there, and we would try to make motors run that had been used up the day before.

I know a good many officers in the Air Service who will disagree with me on this, but I think the situation would have been greatly improved if the command had had more experience. It was not their fault. You may say you can get your experience under the Army and the Navy as well as with an independent air service, but the whole scheme of development with an independent air service would be more efficient and help to do away with things like that.

After the war was over I was ordered back to this country and was on duty for about a month. From what I saw it seems to me that

there was a great deal of jealousy against the Air Service because of the proportions to which that service had grown.

Some of the higher officers in the Air Service were men who had had a great deal of experience in the Cavalry or the Infantry, but who had had very little experience in the Air Service. There seemed to be a feeling among some Army officers that as the Air Service grew in importance the other services decreased proportionately, and there seemed to be a great deal of jealousy along that line.

I was ordered back here with Capt. Rickenbacker, supposedly to assist in the reorganization of the American Air Service on a peace basis. We stayed around for three weeks or a month, and we were able to accomplish almost nothing.

Another situation, which I think a united air service will help, is the production department, which is so very important. Something was said about the Aircraft Board, but I am not familiar with the details of that. But one thing that was done was the canceling in the fall of 1917 of orders for Spad machines. I believe that is true. It was on the ground that that machine would be obsolete by the time it got to the front.

As a matter of fact, it was considered to be a good machine, if not the best machine on the front, and that same machine, the order for which was canceled in 1917, was the machine with which the American Air Service was practically entirely equipped at the end of the war, in November, 1918.

Anybody in a French school could have told that it was absolutely untrue that the Spad machine was obsolete or that the single-seater pursuit machine was going to become obsolete. There was no such thought in anybody's mind. In consequence of the failure to produce those machines, some of the early American squadrons went out on a type of machine, the Nieuport 28, which was a machine which was not fit to be flown on the front because it was not sufficiently strong. A number of men lost their wings and several men were killed by the motor catching fire, and others came down in Germany and were taken prisoners because the wings came off. It also had been tried out in the French group which I was in in December, 1917, and was turned down and was refused by the French service. Our service could not get anything else. The Spad machines came from the French and the French, naturally, kept the best ones for themselves. The Hispano-Suiza motors were made by a number of different companies on the other side, and naturally they kept the best for their own service and gave us what they could spare, and they could not be blamed for that at all. So those machines were not as reliable as the machines the French had and the motors were not as reliable. I think by proper organization that feature could be done away with.

When we got the Hispano-Suiza motor made in America, I happened to get it in the fourth pursuit group, the 25th squadron, which was the only squadron with the English S. E. 5s. That machine was equipped with the 180-horsepower Hispano-Suiza motor made by the Crane-Simplex people, and I never have seen a Hispano-Suiza motor that worked better than that one. They were first rate, and that showed that they could be produced here.

Mr. LaGuardia. They were actually produced here?

Mr. BIDDLE. They were produced here, but they did not come over until the last.

Mr. LAGUARDIA. With a proper service that kept abreast of the times, calling into the service at the time we entered the war men who knew the conditions, do you not think we would have immediately put into production some of these motors?

Mr. BIDDLE. We would have gotten something, so that we could have put something on the front to stop the Germans, and not waited until we had what we thought was the best thing before anything was sent out. I have had no experience with bombing squadrons and with the Liberty motor, but I remember one of the first Liberty motors that came out over at Romorantin had had made some 18 changes in the specifications as sent from England, and when we got that machine there, all those things had to be torn out and put back.

Mr. LAGUARDIA. You agree fully that an Air Service in order to successfully carry on its functions should have freedom of action?

Mr. BIDDLE. Absolutely; you should have in it officers who are air officers, who know about airplanes and understand the difficulties which the men are up against at the front.

Mr. LAGUARDIA. I think we are all agreed in that, that we should have men who know the air in command of the air force. While a man may have an excellent record as a soldier and may be an excellent soldier, yet he might be wholly at a loss in commanding an air force.

Mr. BIDDLE. Of course.

Mr. LAGUARDIA. Your source of supply is extremely important to your service at the front?

Mr. BIDDLE. It is absolutely vital.

Mr. LAGUARDIA. If there is a breakdown in any one thing it might keep the whole Air Service on the ground?

Mr. BIDDLE. There is no question about that.

Mr. LAGUARDIA. The training of a pilot is the same whether he wears one uniform or the other?

Mr. BIDDLE. Absolutely the same. The Royal Naval Air Service and the Royal Flying Corps before they were consolidated into the Royal Air Corps, did very much the same work. In Flanders we were right alongside of a number of British squadrons, and the men of the Royal Naval Air Service and the Royal Flying Corps did the same sort of work. They did considerable bombing, similar to that of the northern bombing group.

Mr. LAGUARDIA. All that work is united now in one control?

Mr. BIDDLE. As I understand it.

Mr. LAGUARDIA. In the northern bombing project they used land machines exclusively?

Mr. BIDDLE. Absolutely. They do not do any bombing in flying boats.

Mr. LAGUARDIA. Do you remember at the time of the northern bombing project there were some personnel which had no machines, and we attempted to get some navy flyers?

Mr. BIDDLE. I remember that was the case.

Mr. LAGUARDIA. That was a time when there was personnel going to waste because of the division of command?

Mr. BIDDLE. Yes.

Mr. LaGuardia. You agree with the testimony given this morning that it would be extremely useful to have a large number of men engaged in flying work throughout the country?

Mr. Biddle. That is the only way to train a man in the air—to let him fly and get experience, and let him have a little actual experience in flying across country before he gets to the front. We used to send men out on their first patrols and they would land anywhere from the place where they were supposed to land all the way to the Swiss border. Finally it got so bad that I instituted in my squadron a class in geography, and we would not let them fly until they learned the landmarks.

Mr. LaGuardia. Would you be in favor of a national academy of aeronautics?

Mr. Biddle. I do not know just what you mean by that.

Mr. LaGuardia. I mean an academy similar to West Point and Annapolis, to turn out officers for the flying force, to give them technical and tactical training.

Mr. Biddle. There should be some school in which officers get that experience. Whether it would be necessary to have a national academy like Annapolis or West Point, I am not sure. But provided you can increase the Air Service to an adequate size I should think it would be a very good thing.

Mr. LaGuardia. You approve heartily of the proposition of a united Air Service, with the proper man at the head of it, which will function efficiently, and you believe that would encourage and stimulate the aviation industry in this country and give us the potential air force we require?

Mr. Biddle. I certainly do. In regard to a national aeronautical academy, you would get away from this situation which we had in France. When the American Air Service first started to function on the front, we went through all over again a great deal of the experience which the British and French had had in the early years of the war, and we made a number of mistakes, I think, in flying policy and tactics which were tried out and found unsuccessful and were discarded. If the mistakes of the Allies had been studied and their experience used ahead of time I think a great many of those unfortunate things could have been done away with.

Mr. LaGuardia. That was for the reason that the men who first took hold of the development of our aviation had not been in aviation up to that time.

Mr. Biddle. They had been in some other arm of the service which was not familiar with aviation; but it was not their fault.

Mr. Hull. You spoke of the cancellation of the order for the Spad machines. Are your familiar with the fact that that order for cancellation of that contract came from the other side and did not originate here?

Mr. Biddle. Yes; I am familiar with that.

Mr. Hull. It came from the actual men who were flying?

Mr. Biddle. I beg your pardon, but you are mistaken about that. I am quite sure it did not come from the men who were flying, because no man who was flying on the front would have for a moment dreamed of making such a statement.

Mr. Hull. Where did it come from?

Mr. BIDDLE. I can not answer that question. I am sure it did not come from the men who were flying.

Mr. HULL. It must have been inspired by the men on the front. Of course the cablegram was signed with Gen. Pershing's name, but everybody knows it was the Air Service men who must have originated and inspired that order. I have never heard that questioned.

Mr. BIDDLE. I would question it most seriously.

Mr. HULL. It would be very interesting to know where that order did come from. The Aircraft Board operating on this side had nothing to do with it. If you had a united Air Service this is true, is it not, that if orders came from the front to stop production those orders would be obeyed?

Mr. BIDDLE. At the time that order came through there were no American flying officers on the front in the American service. It was in November, 1917. There were a number of men enlisted in the French Army. I knew those men and I never heard one of them who was asked the question whether those machines should be continued in production or not. There were no American officers on the front at the time, and I think no Americans in the service were ever asked the question.

Mr. HULL. Coming from France we considered that it came from the front, because France was considered the front. It must have come from the Air Service, which was a united air service on the front, so far as we know.

Mr. BIDDLE. Of course, because a man was in France that did not mean that he was on the front. There was another part of the organization not on the front, the same as the organization here.

Mr. LAGUARDIA. When did you first hear of that cablegram?

Mr. BIDDLE. I think it was about the middle of the year, or the first part of 1918, or along there somewhere.

Mr. LAGUARDIA. In France?

Mr. BIDDLE. Yes. I would say it was approximately about that time.

Mr. LAGUARDIA. How did you hear about it?

Mr. BIDDLE. Perhaps it was later than that. I got it through the Air Service.

Mr. LAGUARDIA. I did not know about it until I got home.

Mr. BIDDLE. I think the information was sent over by somebody I knew here in this country. I know I got it about that time. I have forgotten exactly how. I know several of us talked it over, and we were perfectly astounded and wondered if it were true.

Mr. HULL. Did you blame the people on this side for it when it originated on the other side? It came signed with Gen. Pershing's name, whether or not it came direct from Gen. Pershing, and it ordered the production of the Spad machines stopped.

Mr. LAGUARDIA. The members of the committee know that every day each branch of the service sent its messages by paragraphs, and at the end of all the paragraphs there would be one signature, that of Gen. Pershing. But the man who sent that cablegram was Col. Gorrell. After that was sent we had constant communication with the Air Service in this country and conferences over there and exchange of officers, and it was known that we were in need of pursuit planes.

Mr. BIDDLE. Always, and always will be in any war. There was another report, if I am not mistaken, sent through by Col. Bolling, and Col. Bolling was in touch at that time with men who had had experience on the front, and, as I understand it, his recommendations differed very much from some of the other recommendations, but no action was ever taken on them.

Mr. LAGUARDIA. If Mr. Hull would read the hearing held before the Senate committee during the war in connection with aviation he will find a good deal of discussion there in connection with the fact that they had abandoned the Bristol fighter because it would not take the Liberty motor.

Mr. BIDDLE. Nobody who had ever had experience with the Bristol fighter would have thought that it would take the Liberty motor.

Mr. HULL. According to your testimony you practically had only three months' training?

Mr. BIDDLE. Yes.

Mr. HULL. And you actually became a flier in three months from the time you started?

Mr. BIDDLE. I enlisted in the French service in March, 1917, and I started my training at Avoir about the 14th or 15th of April, and I was ready for the front about the 15th of July. That was in the spring of the year, when they had good weather, and the French were very seriously pushed for pilots.

Mr. HULL. Was there any shortage of flyers from America?

Mr. BIDDLE. In the American service?

Mr. HULL. When we got started.

Mr. BIDDLE. There were a great many more flyers than machines and there was sometimes a little delay. There would be sometimes a surplus of pilots, and at the time of an offensive, when there had to be replacements, they would be delayed a few days in coming up, but there was no serious shortage of pilots.

Mr. HULL. You are sure of that? Some of the men who were over there say that there was.

Mr. BIDDLE. I was in pursuit work, and I do not know about the other branches of the work.

Mr. HULL. You were in command of a squadron at the time they say there was a shortage of flyers, and it seems to me you would know. I quite agree that it seems an almost impossible thing, because we had sent so many over there. I know men who were over there the entire time; they were flyers, but they never got into the air at all.

Mr. BIDDLE. I was in command of a squadron during that time, and during the St. Mihiel offensive and the Argonne we lost 12 pilots in three weeks and their places were filled the next day.

Mr. LAGUARDIA. Here is the telegram which has been referred to. It is No. P 375 and dated December 14, 1917, and it says:

> With reference to paragraph 1 your cablegram 461. Do not recommend unionized production Spad airplanes for France. No such request received from French here. Believe they can produce all these airplanes they need. Think our only efforts should be applied airplanes and engines already on our program. United States should leave production single place fighter to Europe.

So you see that is only an expression of opinion which should have been followed up and scrutinized and checked up in every particular. This cablegram was sent by Col. Gorrell, and you will find his testimony in full before Mr. Frear's subcommittee in which he tries to

justify the sending of this cablegram, but so far as I have been able to learn this was never followed up but put away and forgotten until the Senate committee's investigation when they said, "We did not build fighting planes."

Mr. BIDDLE. There was not at any time a serious shortage of pilots. The shortage was in machines and spare parts. The squadron of SE5's which I got at the end of October had not, up to the time I left the squadron on the 1st of December, gotten a single spare part, although they had had the machines there for six weeks. You could not get wheels or radiators. They used to bring the machines in from one flight, and while waiting for the next patrol to go out we would take the wheels off of a machine just in and put the wheels on another machine which was going on.

Mr. LAGUARDIA. Thank you, Major.

STATEMENT OF CAPT. WALTER R. LAWSON, AIR SERVICE.

Mr. LAGUARDIA. Captain, where are you stationed?

Capt. LAWSON. I am stationed at Langley Field, Hampton, Va.

Mr. LAGUARDIA. What are your duties there?

Capt. LAWSON. I am, at present, Acting Wing Operations Officer.

Mr. LAGUARDIA. How much equipment have we at Langley Field?

Capt. LAWSON. We are, at present, under War Department Air Service orders making a physical inventory, and I think no human being in the world can say until we get through with our inventory just how much we have.

Mr. LAGUARDIA. We have some Army air forces there?

Capt. LAWSON. Air squadrons?

Mr. LAGUARDIA. Yes.

Capt. LAWSON. We have two squadrons there and wing headquarters.

Mr. LAGUARDIA. Longley Field is a pretty good field?

Capt. LAWSON. An excellent field.

Mr. LAGUARDIA. We have the structures and everything necessary there?

Capt. LAWSON. The permanent building program is not completed, but there is a sufficient number of temporary buildings to take care of all organizations there at the present time, and the permanent buildings there are very good, and there are quite a few of them.

Mr. LAGUARDIA. What transportation facilities have you in connection with Newport News?

Capt. LAWSON. There is a trolley line that runs across a bridge built by the Government which leads into the entrance of the field. The trolley line runs across that bridge and runs into Hampton. It was built by the Government and is operated by the local car company. That joins onto the main road between Newport News and Hampton.

Mr. LAGUARDIA. How long does it take to get to Newport News?

Capt. LAWSON. From the field about 45 minutes. All the freight comes in on the same line.

Mr. LAGUARDIA. The statement was made on the floor of the House yesterday that Langley Field was entirely abandoned.

Capt. LAWSON. It is not entirely abandoned. At the present time I understand—I have no figures to back up the statement—that there is an investment there of over $8,000,000.

Mr. OLNEY. You think it ought to be retained?

Capt. LAWSON. By all means. If it is not, it will be an excellent site gone to waste, and other coast-defense stations up and down the coast which are established where the fortifications on the coast are necessary will have to be established. This field is ideally located, with Fort Monroe on one side and Fort Storey on the other, and it is an excellent location for bombing. It is a large field, big enough to get any kind of a plane in and big enough to operate two groups from.

Mr. OLNEY. What is the flying time from Washington?

Capt. LAWSON. It is 135 miles, which is about 120 minutes, with a DeHaviland machine.

Mr. LAGUARDIA. We have a school of application there.

Capt. LAWSON. It is to be.

Mr. LAGUARDIA. You served overseas?

Capt. LAWSON. Yes, sir.

Mr. LAGUARDIA. In the Regular Army?

Capt. LAWSON. No, sir.

Mr. LAGUARDIA. When did you enter the service?

Capt. LAWSON. In June, 1917.

Mr. LAGUARDIA. How long have you been in the Air Service?

Capt. LAWSON. I have been in the Air Service since January, 1918.

Mr. LAGUARDIA. Prior to that what branch were you in?

Capt. LAWSON. Prior to that I was in the Infantry.

Mr. LAGUARDIA. During the war you served overseas?

Capt. LAWSON. I served overseas from October to January with the Rainbow Division and after that time in the Air Service, later being assigned to the 91st Squadron.

Mr. LAGUARDIA. In what capacity?

Capt. LAWSON. From January to March I was in school, and then I was an observer about the middle of April, and I served with a French squadron on the front until about the 26th of May. I was assigned to the 91st Aero Squadron then commanded by Col. Reynolds and served with them until July 30 when I was wounded and was in a hospital a month and then returned and served until about the middle of October when I was sent to this country as an instructor.

Mr. LAGUARDIA. As an observation instructor?

Capt. LAWSON. As an observation instructor, just about two weeks before the armistice.

Mr. LAGUARDIA. You have been decorated?

Capt. LAWSON. Yes, sir; I had the distinguished service cross.

Mr. LAGUARDIA. What are your views in regard to a united air service?

Capt. LAWSON. My views—aside from the experience I had overseas, I have been stationed in the Office of the Director of the Air Service from April until October, and in that time I was in contact with the civil operations in that office, and as a result of my experience it is my earnest opinion that a separate department or a united

air service would be highly beneficial for the future of the Air Service of the United States.

Mr. LaGuardia. As an observer, do you feel that observers for the Army and Navy could be properly trained under one service?

Capt. Lawson. Yes, sir; I do.

Mr. LaGuardia. And such special knowledge as they should have in connection with the direction of artillery fire or with naval spotting could be taken up with those branches?

Capt. Lawson. Yes, sir. Quite easily. I think any organization which provides for a united air force should provide for the detaching of Air Service units in time of peace to the Army and to the Navy for tactical maneuvers or anything like that. I think they should be detached for instruction in tactical maneuver work.

Mr. LaGuardia. You have heard the testimony of Maj. Meissner and Maj. Biddle and Commander Child. Do you concur in their views?

Capt. Lawson. Entirely so; although theirs was an entirely different line of work, practically speaking. All of my work was Army observation. I was in the long-distance reconnaissance work and photographic work and went over the enemy's lines for a depth of 35 kilometers on those missions.

Mr. LaGuardia. To carry on that part of the work you are dependent to a great extent on the efficiency of the pursuit group?

Capt. Lawson. Yes. To be of any great assistance in our work we should have more fuel capacity and greater distance. I think the Spad capacity was about two hours. With the Sansom, which was an observation plane and a slower climber than the Spad, we had to go over at a very high altitude, and in gaining that altitude we consumed as much as an hour's capacity, and after we got our altitude we had left more than the Spad's capacity, and we had to furnish our own protection.

Pursuit work is highly essential for observation along the line. But because of the conditions I have referred to, in many instances we protected ourselves by formation flying.

Mr. LaGuardia. While that should be under the command of the Army or Navy commander responsible for the operation, you still feel that you ought to be under the direct command of an air force commander?

Capt. Lawson. Entirely so. In being assigned to an Army unit of course you have your General Staff organization. Say, the Intelligence Section would ask for what they wanted, that request would be transmitted to the Air Service, who, in turn, would give the necessary orders. That is the General Staff organization. If the Intelligence Department put in a request for what they wanted that came through the Air Service commanders.

Mr. LaGuardia. You are also a pilot?

Capt. Lawson. Yes, sir; I am.

Mr. LaGuardia. As far as your experience goes, there is not any difference between an Army pilot or a Navy pilot?

Capt. Lawson. In actual flying, I do not think so. It might take a little dual-control work to familiarize one with different conditions that would prevail. But so far as actual flying is concerned I think if a man is a flyer, and can really fly, he can fly almost any type of machine.

I would like to make one statement, Mr. Chairman, in regard to the De Haviland plane. I know that the De Haviland that came to France was not equipped with our type of cameras that we used in our work. We were using the Salmson planes and the French cameras, and I found after I got back to this country that another cablegram had been sent which did designate the type, and stated that we had adopted the French method of photographic equipment, and when the De Havilands came over they were constructed so that we could not possibly equip them with the cameras we were using, and we continued to use the Salmson.

Mr. LaGuardia. You did not fly the De Haviland?

Capt. Lawson. Not up until the time I left.

Mr. LaGuardia. If you had a choice between the two, which would you use?

Capt. Lawson. I would prefer the Salmson.

Mr. LaGuardia. As far as the training goes there is no reason why fliers could not be trained under a united service, is there?

Capt. Lawson. I can see no reason.

Mr. LaGuardia. And also observers, as far as air work goes.

Capt. Lawson. And also observers; their tactics would have to be gotten from Army and Navy tactics, but that is true now and will be true at all times.

In connection with the commercial aspect, we have a Geological Survey and a Coast and Geodetic Survey Service. Air photographers have taken a very important part in surveying the country, and 42 per cent of the United States has been so surveyed, against a cost of $2,300 a square mile for actually surveying the city of Washington. A mosaic was made of the city which brought everything out and the total cost could not have been possibly over $500, including the cost of gas, oil and everything. That is a proposition which is just developing. The Coast and Geodetic Survey is very anxious to have a lot of that work done along the coast. That photographic work is one of the things which, if I am not mistaken, Gen. Pershing testified was invaluable as a source of information in time of war. Photographic work of any kind is merely a repetition of what you would do in obtaining information and photographs in operating against the enemy.

Mr. LaGuardia. It would be the best kind of training.

Capt. Lawson. It would be, indeed, yes; the highest kind possible.

(Thereupon, the subcommittee adjourned to meet tomorrow, Saturday, December 13, 1919, at 10 o'clock a. m.)

Subcommittee on Aviation of the
Committee on Military Affairs,
House of Representatives,
Monday, December 15, 1919.

The subcommittee met at 10.30 a. m., Hon. Fiorello H. LaGuardia presiding.

STATEMENT OF HON. NEWTON D. BAKER, SECRETARY OF WAR.

Mr. LaGuardia. Mr. Secretary, Mr. Crowell made the same statement before this subcommittee that he made before Mr. Frear's sub-

committee, I believe, and he also inserted as a part of his statement the report of the commission which you appointed to study aeronautical conditions in France, England, and Italy, with the understanding, as Mr. Crowell stated, that you and he differed on the policy of having a separate Air Service, and the subcommittee desires to have a statement of your views on the subject.

Secretary BAKER. Mr. Chairman, full consideration of this subject, from my point of view, is given in my annual report for 1919. I do not know whether the members of the subcommittee have done me the honor of looking at that or not, but I studied the question as carefully as I could, and the whole argument, as it seems to me, is set out there. I am entirely unfamiliar with the testimony which has been had before your subcommittee, and so would like to be directed by you to any subject on which you would like to have my views.

Mr. LAGUARDIA. In substance, Mr. Crowell testified that he would favor a united air service, the establishment of a separate department, the head of which would be a civilian, not necessarily a member of the Cabinet; that this department would have jurisdiction of all aviation matters connected with the Government, and also the personnel, and that it would assign to the Army and to the Navy such squadrons as they needed for their operations, and that while so assigned they would be under the jurisdiction of the Navy or the Army commander, as the case may be. That is in general the substance of his statement.

Secretary BAKER. I do not want to discuss Mr. Crowell's views. I am perfectly willing to discuss the way of dealing with the Air Service. Mr. Crowell is perfectly free to express his view. He and I radically differ about it.

Mr. LAGUARDIA. Do you believe, Mr. Secretary, that we should unite the production of aviation?

Secretary BAKER. I think we ought to unite the production of aviation materials sufficiently to use the appropriations which the Congress makes with a view to preserving as far as possible all necessary facilities for the production of aircraft.

Mr. LAGUARDIA. Would you go beyond that and put the primary training in a united service?

Secretary BAKER. I would not unite any training. My reason for that is this: We must train our military forces in peace time so that when the emergency of war comes they will have as little to learn in the matter of cooperation as is possible. They ought to be trained so that when the stroke of war comes every man knows his duty and knows his relation to everybody else, and is so accustomed and habituated to cooperation and to the relations that exist between him and others that there will be nothing of that for him to learn.

I think primary training, so called, is probably the same for any aviators. The elementary training men get in merely operating airplanes is probably the same for Navy, commercial planes, and Army planes. But the value of association in the Army, as in the Navy, beginning at the very start of the service, seems to me to be much too valuable to be lost sight of. The identification of an Army flier with the Army is a very valuable thing, and if they have that sense of identification, realizing that they are parts of a combined and

aggregate service, it has a very great disciplinary value in actual operation.

Mr. LaGuardia. You do not believe then that a better spirit of morale can be developed by having a separate air force, inasmuch as the air fighting now has so progressed that there will be a great deal of it if we have another emergency. We feel that we want to obtain exactly the same result as you describe.

Secretary Baker. I am sure you do.

Mr. LaGuardia. There are two schools of thought on the subject. Those who belong to one school believe we should continue under the present status, while those who belong to the other school feel that we should perhaps follow and even go a little beyond what England has done. Do you believe then that more can be accomplished by the system we now have under which the Army and the Navy and the Post Office Department and the Interior Department carry on their own work, with four or five different appropriations, than by bulking all those activities and the training of these men and developing a new department?

Secretary Baker. I do not want to answer that question categorically. The question of the Air Service is really two questions, first, its military aspect, or the military question, and, second, the commercial aspect. I do not know, and I do not think anybody else knows, what the future of aircraft, commercially, may be. People have different views upon that. It is a very fascinating and new agency and the men who are enthusiastic about it look forward to the time when it will be carrying passengers and replacing present modes of rapid transportation of passengers, and some think that aircraft could be so developed as to form a substantial contribution to the transportation of goods. Everybody agrees that the navigation of the air is of such nature that whether it is for commercial or military purposes it must be controlled by the Government, and that for two reasons. First, the work of the aviator itself is such that the most rigid supervision and inspection of the agencies which he employs must be insisted upon. We can not allow every individual to build and buy an airplane and be flying in the air and expose himself and others to hazardous consequences.

In the second place, the people over whom they fly have to be protected against aviators kiting around in the sky dropping themselves or something else on anyone in the congested areas. On the high seas the areas included are much larger and wider and not so congested; but yet, there is a great amount of restriction and restraint needed there. On the ground, certain highways are established and provided, but in the air a man can fly over Chicago and drop his balloon into a bank and burn up a bank, as has already been done. So I think it has to be insisted that there must be Government regulation, inspection and control, and that control probably, in this country, will have to extend, to some extent, at least, to the manufacture of aircraft. We can not allow persons to manufacture aircraft without some assurance that their engineering is sound and their inspection of material adequate.

Of course, a subject like this fascinates the imagination of sober-minded men and the eccentric as well, and we have all sorts of schemes for the promotion of aircraft, some of which are scientif-

ically sound and some unsound. So, realizing that Government control is absolutely essential, I am entirely of the opinion that we ought to have as much centralization as we can get without sacrificing essential things.

For that reason I can see no objection to that coordination of the inspection, engineering, and purchase ends of aircraft as will secure concentration of purchase, encouragement of facilities for manufacturing purposes and the joint benefit of improvement in design, to prevent duplication and waste of effort.

But I am not persuaded—indeed, I think it is quite obvious that the recent tendency is all the other way—that a consolidated bureau having to do with training and with the assignment of airmen to the Government services, temporarily, leaving them as members of a single service, would be wise. I am sure that would not be so when you consider the nature of the military use of the airplane.

Mr. LaGuardia. If the Army had a sufficient air service, would you oppose the use of your men and equipment for useful purposes, for instance, the carrying of mail or work with the Coast and Geodetic Survey? Do you not think that would be a good way of using our equipment and keeping our men in training?

Secretary Baker. No; I do not think so.

Mr. LaGuardia. Would you prefer to have it controlled by a separate department?

Secretary Baker. If I can foresee anything about the Air Service at all, the commercial airplane service hereafter is going to be a high-grade mechanical service. I do not mean that in any disrespectful sense; I mean the man who does a humdrum thing, flying on a regular schedule daily, and whose sole duty is to fly a certain distance and deliver a pouch of mail, is going to stay along at that business. The fighting aviator is an entirely different quantity; his duties require qualities that are not needed, and indeed he is hurt by having some of the qualities most valuable in the daily, routine dead-level flying.

Mr. LaGuardia. You would not care to have men in the Air Service of the Army doing that work?

Secretary Baker. I can imagine nothing that would break the spirit of military aviators quite so much as to be day after day flying a stated distance and delivering a pouch of mail and then being through with the job.

Mr. LaGuardia. What department do you believe ought to take control of navigation, of the licensing of pilots, the supervision of production, and the testing of planes?

Secretary Baker. So far as it deals with regulations on land and with the commercial use of airplanes, I should say, without very much thought on the subject, that a departmental board, under the presidency of the Secretary of Commerce, would be the best way. I think the Secretary of Commerce might very properly become associated with representatives of the Army, the Navy, the Post Office Department, and any other services using airplanes and form a kind of advisory council so that no commercial regulations will be made which will be prejudicial to the best development of all types.

Mr. LaGuardia. Would you put the supervision of production in the departmental board?

Secretary BAKER. I think there ought to be a board on which the various services would be represented which would cooperate in that matter.

Mr. HULL. Mr. Secretary, I am glad to hear your statement in regard to that. I think your idea and the idea I have tried to incorporate in a bill are practically along the same line. I would like to explain my idea briefly and ask you if you see anything wrong with it. My idea is to have a department of aeronautics, consisting of one director of aeronautics, to be appointed by the President and confirmed by the Senate, with three or four assistants, one of them coming from the Army—and I presume that man would be selected by the director of aeronautics in cooperation with the Army; I would presume he would be necessarily a man who was in sympathy with the present fliers of the Army, if such a man could be found big enough for the job. If he could not, you would have to take somebody else. Then I would have another one of those assistants from the Navy, who, in the same way, should be in fairly good relations with the fliers of the Navy, so he would have their sympathy and the sympathy of the Navy, and their viewpoints, if you can get that kind of a man in there. Then I would have another assistant from the Post Office Department, representing the commercial side. Whether there would be another assistant appointed from the Interior Department, or the Department of Commerce is immaterial to me. I think four men would be sufficient.

These four men would necessarily compose a board, and in my bill I have tried, and I think fairly well succeeded, in giving this board absolute authority, so far as it goes, so that on the question of field, production, engineering, and up to the point of training this board would have absolute authority. After they had looked over the field and studied it everything would be turned over to them up to that point. Of course, if the Army or the Navy wanted some of those things turned back to them, they could get them by asking for them, provided this board thought they ought to go back.

But the Army and the Navy would retain their personnel absolutely, unless they thought it would be best to turn that over to the board and they wanted to do so, acting through this board. Then they could detail them, if they wanted, to this department of aeronautics. That would be your point?

Secretary BAKER. As I understand you, I would not be in favor of that at all.

Mr. HULL. Is not that your idea?

Secretary BAKER. I do not think so. You are putting in some man as director of the air service who would have the power to control the Army's development of military aeronautics.

Mr. HULL. Up to production. He would not control the training. He would not necessarily control it if he thought it was best that it should go back.

Secretary BAKER. You would not want to have a director appointed who represented the steel industry——

Mr. HULL (interposing). Oh, no; he ought not to represent anybody but the Government of the United States.

Secretary BAKER (continuing). Selected from the steel industry to control the kind of guns that should be made for the coast defense of the United States. The Army ought to be able to determine solely and absolutely what kind of airplanes it wants for fighting airplanes.

Mr. HULL. They would have the power to do that. They would have a man on this board.

Secretary BAKER. Apparently he would be there as a kind of supernumerary. He is not the controlling authority; the director is the controlling authority. I think that plan is defective for this reason: It creates an independent agency, an executive department, to report to the President, and I think that is putting an additional burden on the President of the United States, who is a very busy man, and as the country grows larger the occupation and duties of the President become more and more exacting. I do not know any man who would have the time to give real personal attention to these various separate agencies that are being set up to report to the President. It seems to me our whole theory of Government has got to be the consolidation of the function of government into the great departments, with conferences or committees of heads of executive departments to control, where they coordinate; their recommendations can be laid before the President or the executive departments represented in the Cabinet.

Mr. HULL. To whom would you have him report?

Secretary BAKER. Personally, I think, if you had the Secretary of War, the Secretary of the Navy, the Postmaster General, and the Secretary of Commerce as a board to correlate and control the common functions and allow them to decide how far the functions are common and how much would be taken into a separate agency, it would be better.

Mr. HULL. We have that now in the Aircraft Board?

Secretary BAKER. Yes; and it is working well.

Mr. HULL. Practically working now?

Secreary BAKER. Working all right.

Mr. HULL. From the testimony we have gotten, it is not working satisfactorily; but, of course, I do not know about that.

Secretary BAKER. I am unfamiliar with the testimony which has been given to your subcommittee; I do not know what has been testified. My interest in this is diminishing, except as a citizen. My term of office is nearly over. But I am very much interested in my successor, and I am interested as a citizen, although my own relation to the problem is to be relatively brief.

You have been on the Committee on Military Affairs a long time, and you know that competition between the services is the thing that has caused you most embarrassment. The Navy comes before the Committee on Naval Affairs and gets its appropriation, and the Army comes before the Committee on Military Affairs and gets its appropriation; if you have a separate Air Service it will come before an air service committee and get its appropriation. You will have a third committee of the House of Representatives dealing with a part of the same general problem, and there will be no correlation down here at all and none at the other end of the Avenue.

Take the Air Service from a military point of view. What is it? It is an arm of the military service. At present the chief use of air-

craft in war is not bombing. Bombing is more or less futile. I say that advisedly.

Mr. HULL. I quite agree with you.

Secretary BAKER. At present the chief use of aircraft in war is observation, reconnaissance, and the control of artillery fire. If you did not have aircraft you would do that by some other agency within the Military Establishment.

To build a separate agency to do that—I am now taking the extreme view—a separate Air Service which would be loaned to the Army to do that job, which was not otherwise associated with the Army, and with a competitive desire to establish a separate record apart from the Army and the Navy, would not produce harmonious results. It would not produce cooperation; it would produce competition. You have had down here, on the question of promotion, competition with all of the most unhappy results flowing from that competition. Let us take one further step. Suppose you try to separate the Air Service. Where will you separate it? The Air Service is a fighting agency that uses weapons. It has bombs, machine guns, rifles, pistols, and perhaps cannon some day, all of which are parts of the armament which the Army prepares for its soldiers. Even on the ground there must be an antiaircraft defense. Are you going to take the groundwork of combat airplanes away from the Army and give that to the Air Service?

There are many people who believe—and I am one of them—that the aerial bomb bids fair to replace the heavy gun. The heavy gun is an immobile thing, at best, even when you put it on a tractor it is an immobile thing.

The aerial bomb is in its infancy. The time will come, I think, when the great guns of the coast defense and of battlefields will be replaced by aerial bombs, which can be launched from any place.

If we pursue that thought we find that the probable development of the air service will be to take over what the artillery now does; so you will transfer the artillery to the air service. Then you will have, perhaps, machine guns in the airplanes doing better service than the riflemen on the ground, and you will transfer the infantry to the air service; and the ultimate result of it will be that you will have it all in the air service and the present War Department will be absorbed and go out of existence. That is not wise. The wise thing is to keep the Army under the control of the War Department and let the development of the whole fighting Army take place and the change in the character of war go forward as it has in the past.

Mr. HULL. I quite agree with you. I would expressly leave, absolutely, all the personnel with the Army. There would be no question about that. This board would have nothing to do with the matter of promotion.

Secretary BAKER. What I had in my mind was that when you had an air service as a competitor with the Army instead of a part of the Army, there would be competition for the glory of winning the war. For instance, everybody is trying to find out who won the war. The artillery say they won it; and the infantry say they won it.

Mr. HULL. I do not contemplate making them a competitor because they would not have anything to do with the fighting. That would be wholly up to the Army and the Navy. What I want to do

is to coordinate the production, and the air service in general, so far as the commercial side is concerned.

Secretary BAKER. On that particular point, my objection to your statement—I do not know whether it is in your bill, because I have not had an opportunity to read it—my objection to your statement is this, that if you put the coordination of production in the hands of an independent agency which reports to the President, and not in the hands of an agency jointly selected by the Army and the Navy, and the Post Office Department, which reports to the heads of those three groups, you would not yet get a coordination of the activities.

Mr. HULL. The trouble is we do not get coordination. I do not want to criticize at all, but I have gotten the idea, as we have gone over the country that there was not coordination. We were confronted with this fact, as we went over the country, that there was a lack of coordination between the Army and the Navy.

Secretary BAKER. If I were to admit that, which I may do for the purposes of the argument—if I were to admit that I would still say it is not open to criticism because we have been building these agencies up in the excitement and hurry of war when the time necessary to produce coordination in such things as that has not been allowed; but we are making very great progress toward coordination.

Mr. HULL. We have no central authority to issue licenses, which I think is absolutely necessary.

Secretary BAKER. I agree with that.

Mr. HULL. Nor have we a central authority which can issue rules and regulations, and that ought to be done.

Secretary BAKER. Yes.

Mr. HULL. When it comes to the matter of a field, as I saw it in one case, the Post Office Department wanted one field and the Army thought they ought to have another field, and the result was, as I remember it, that there was not any field at all.

Secretary BAKER. That is a temporary situation.

Mr. HULL. That is one of things we have all the while, and I can not see why that part of it should not be centralized. The question of whom the man in charge of it should report to, of course, is not so important. He can not make a report to the Army, because if you do that, the Navy would object, and you can not make him report to the Navy because if you do the Army would object, and there would be a conflict there. I provide that he shall report to the President, not necessarily asking any particular exercise of authority from the President, but simply providing that he shall report to the President.

Secretary BAKER. You are dealing now solely with the question of production?

Mr. HULL. Yes.

Secretary BAKER. How would that work out? Suppose the Army wanted to have Congress authorize it to have 100 solo fighting airplanes. Where would they get them under your bill?

Mr. HULL. They would make a requestion on the department of aeronautics, and when they explained what they wanted it would be up to the production end of the department of aeronautics to——

Secretary BAKER (interposing). To either give them what they wanted or something else?

Mr. HULL. To give them what they wanted.

Secretary BAKER. Then I have no objection to it.

Mr. HULL. The design of the airplane would be left to the Army.

Secretary BAKER. Then I have no objection to it. You know the trouble we have had with the Ordnance Department. The controversy that has gone in the Army has been between the Ordnance Department as the producer of the weapons and the Army as the user of the weapons. Going through a camp I have had a major general say to me "The Chief of Ordnance is a mere manufacturer; he does not know what we need in the field. I see my men use the guns." I come back and the Chief of Ordnance tells me "Those fellows do not know anything about mechanics. I know what a good gun is and my knowledge is based on scientific principles." You know that.

Gen. Crozier was one of the most brilliant men the Army ever had in it, and one of the most brilliant scientists and experts in gun-making, and the controversy between Gen. Crozier and the generals in the field with troops has been constant. It is the difference between the man who uses the gun and the man who makes the gun. If you erect an agency to make airplanes of a certain scheduled strength on scientific principles and if you say to the man at the head of the air service, "These are scientific, and you ought to like them, whether you do or do not," you will run into a difficulty that we want to avoid. The man in the Air Service will have nothing to do with the airplanes and will say, "They are not what we want; we must have what we want."

Mr. HULL. I think your idea and mine are the same. I think if you and I had the time to get together we could probably draw a bill that would suit us both.

Secretary BAKER. I hope you will not overlook the fact that an agency which reports to the President functions through a very necessarily congested medium. If your agency reporting to the President makes an adverse decision in reference to what the Army desires in the matter of airplanes, then we have to go to the President to get a decision either in favor of the air department or in favor of the Army, and you have a very congested medium through which to work.

Mr. HULL. To whom would you have the head of the Air Department report?

Secretary BAKER. I would have him report to a board of members of the Cabinet consisting of the Secretary of War, the Secretary of the Navy, the Secretary of Commerce, and the Postmaster General, under the presidency of the Secretary of War, because he comes first in the list among the members of the Cabinet. That board would have the control of it, and if the members of the board came to a disagreement, then they naturally would go to the President, because he presides over them all the time.

Mr. HULL. You would create a department and simply have this board as the deciding factor in the work of the department?

Secretary BAKER. I would not call it a department; I would call it an interdepartmental board.

Mr. HULL. It would be to some extent an executive department. I do not contemplate having a Cabinet officer at the head of it.

Secretary BAKER. I would make it an interdepartmental board, like the one which has already been created for the study of the development of waterways.

Mr. OLNEY. As you know, Mr. Secretary, the New bill has been reported by the Senate Military Committee, and that bill probably does not meet with your views. Most of the testimony, except that on the part of the Navy, which seems to be jealous of its own rights, would seem to be in favor of the establishment of a united air force. Perhaps your ideas are better than ours, but if we can stimulate commercial aviation through the organization of an interdepartmental board, as you suggest—and I would add to that the Department of Agriculture, because we found during the testimony that aircraft was valuable in the location of fires in the forests and also in the extinguishing of fires by the use of chemicals—such a board might act as efficiently as a department of aeronautics.

Then aviation would also be used in the Department of Interior in some way, and the testimony here before the subcommittee was strongly in favor of a united air force. One witness from California testified that a company there was ready to start a line out there to carry freight and passengers between different points in California and Nevada the instant the Government recognizes the airplane as a future means of transportation.

If we can accomplish all this, and we have in recent bills approved and passed upon certain fields which have been acquired, such as Kelly Field and other fields here and there, and also airplane plants already established. In your opinion ought we to do something, if the airplane is a valuable factor in future warfare, to stimulate production? Our idea was in having a department or a united air force, not to interfere with operations, but to have an efficient air force in the Army, the Navy, the Post Office Department, etc.

Secretary BAKER. Mr. Olney, we ought not to deceive ourselves about the development of the airplane. The only way you can stimulate the development of the airplane is by appropriating money, and the question of the amount for the stimulation of the development of aircraft is a question of the amount of public money you are willing to spend to stimulate it. That is the plain, blunt fact about it. If you are willing to subsidize private companies through the experimental period of the development of aircraft until it can become a sufficiently stable agency of transportation to carry persons and freight, it may be developed in that way, but not in any other way.

Mr. OLNEY. These men who are interested in the future of aviation said they did not care for a subsidy, any more than to have certain stations established here and there throughout the country, and that is not a subsidy any more than the building of good roads for automobiles is a subsidy to encourage the building of automobiles.

Secretary BAKER. In a way; and I am not in the slightest degree criticizing a sympathetic and generous attitude on the part of the Government toward the development of the airplane. I want things done under an agency of the Government.

Mr. OLNEY. You realize it is important?

Secretary BAKER. It is of primary importance. It is one of the most important things the War Department has to progress with.

Mr. FULLER. I did not just understand the Secretary's statement, which, in substance, was that the best way to encourage aviation was by a large appropriation.

Secretary BAKER. That is the only way.

Mr. FULLER. Do not you think it is very important how that money is handled? For example, I can not see—and I assume we are all desirous of encouraging aviation and making the most of its possibilities—I can not see how an interdepartmental board could give the matter the consideration that would be given it if it was made a separate department. If, for example, we were to go to the extreme of having a separate department with a member of the Cabinet at the head of it I can see the objections which you mention. On the other hand, I can not imagine it being developed to its fullest possibilities until it is under a separate department.

Secretary BAKER. Mr. Fuller, of course, we can not find anywhere a man who knows enough or has genius enough to do all this by himself. The development of air agencies, like other agencies, is necessarily the combined work of a very large number of men working under a concentrating, directing, and correlating head. If you had an interdepartmental board consisting of certain members of the Cabinet, each of whose departments had a specialized interest in the development of the air, they would select a single person to report to them, to be himself a centralizing agent.

The reports would be made to them so that they might each see that his own special interest was being properly considered and conserved, but there would be some one person who would head up the thing, taking the ideas of inventors and submitting them to technical and scientific boards for necessary experimentation, and there would after all still be a person who would be the head of the development of air agencies. So I would suggest that you could get from those Cabinet officers enough of their personnel to carry it on, and the members of the board would select a man who would be subject to their joint control and who would report to them, and they would pass on the reports he made. The members of the Cabinet I have named would sit down as a board and the director of the Air Service would come in with a report. He would say, for instance, "A man named Jones, from Nevada, has produced a very interesting development of aircraft." He proposes that we do certain things, and he would write a report about it. Each of the members of that board would take a copy of that report, and I would sent my copy to Gen. Menoher, who would submit it to a board of Army experts; and each of the members of the interdepartmental board would do the same thing in his own department. We would get reports showing what the view of each specialized agency was with regard to that particular invention. Gen. Menoher might report to me that it had no military value, and the Secretary of the Navy might get a report from his naval expert saying that it had no naval value. But the Postmaster General might say it had a very large commercial value. We would say we have decided to spend so much on commercial development, and we would say to the air director, "Prosecute the necessary experiments to determine what value is really there."

Mr. OLNEY. Then that recommendation would come from the Post Office Department?

Secretary BAKER. Yes.

Mr. FULLER. Would it be your idea that the director would have sufficient latitude to give encouragement to aviation in general?

Secretary BAKER. He would have as much latitude as you appropriated money. You see progress in anything that requires invention is possible only when there is the greatest latitude for individual experiment. If we could make no improvement in printing presses until we made the same experiment to see if the improvement would work on any printing press, we would make no progress whatever. It is too expensive for one man to take out two cogwheels and put in one to see if the experiment would work. We would not make any progress.

Aircraft is an exceedingly expensive thing. It has to be constructed of the very highest grade of materials, some of which are very rare, and they would have to be subjected to the most rigid selection so that every possible infirmity will be eliminated. The work has to be done by artisans of the greatest skill. It has to have the highest type of engineering judgment upon it because the airplane is quite large and will undoubtedly be larger as we go into the commercial types. Therefore except rarely there will not be individuals of sufficient ability who will be able to bear the expense of experimentation necessary to develop aircraft. Nor will companies be able to do it. The people will not put their money into anything that is as likely to be smashed up as easily as an airplane is. The replacement of an airplane is very expensive; they are very frail. As a consequence the cost of experimentation is beyond private initiative and the only way we can have experimentation in airplanes is for the Government to see that the experiments are made.

Take the case of the company in California, which has been referred to. They say they are ready to put on a line of airplanes from San Francisco to Carson City, I believe. What they undoubtedly would do would be to buy half a dozen or 10 of the most stabilized types of airplanes. They would start them out in the morning and start back at a certain time. There would be the usual routine about it, because every unusual thing they introduce would imperil their property, and any experiment they make may wreck their enterprise. So there is no prospect of the use of ingenuity from that source. But if John Jones comes from California and says, "I can make a better airplane than anybody else has yet made," and after the scientists have seen a demonstration of it and seen how it works, and they say it looks well, then the Government says, "We will experiment with it." If we ultimately develop a commercial airplane with a helicopter on the top of it to help lift the load and make it possible to carry larger loads, and develop that, your California company will say, "We can afford to take that stabilized type, and we can afford to buy it," and they put it into service. But the cost of experimenting and development is beyond the ability of private initiative, and the initiative must rest upon the Government if the extent to which we are to make progress in the development of the airplane is to be measured by the attractiveness of the service, as Congress provides its terms, and the amount of money Congress is going to appropriate to sustain it.

Mr. FULLER. But it seems to me it is very important also that men come before us at a later period, to quite a large degree they receive these blue prints and the possibilities of their development, perhaps, aside from some particular branch of the service. I am wondering if that can be insured as well by some interdepartmental board as by somebody devoting all their time to the matter of aviation.

Secretary BAKER. That is a very grave problem. This war is illustrtive of that. Everybody in the United States was thinking how he could contribute to the war. Inventors, from Thomas Edison down, gave up everything else to thinking about the perfecting of war devices. Literally thousands of them came into the War Department. We did the best we could, but undoubtedly we made some mistakes. Every sort of device that inventive ingenuity could suggest was brought in there. Some of them were plainly eccentric; some of them that promised well did not turn out so, and some of them that were very ingenious did turn out. The Air Service is going to be very receptive of new ideas.

Mr. FULLER. Gen. Pershing made a casual reference to the Air Service is just simply a branch service, and I gather from what he said to the Military Committees of the House and the Senate that it was not one of the most important branches. Then, later on as these men come before us at a later perior, to quite a large degree they referred to the jealousy of the Air Service, to the fact that the men in the Air Service were younger men and were more prominently mentioned than men in some of the other services, and it occurred to me that this apparent prejudice against the Air Service might be regarded as general.

Secretary BAKER. It is. I do not mean there is any more prejudice or jealousy of the Air Service than there is in all human affairs. You scour the United States and get 5,000 of the most daring youths you can possibly find; fellows willing to take not only the main chance of war, but all the extra hazards of a most perilous occupation; you select them by the most scrutinizing and exclusive processes, and you train them in almost nursery methods. A man is trained a certain way, and the doctors examine his nerves; they make a prima donna of him, and he has a prima donna's job to do. They are a very highly specialized and a most carefully selected crowd of men. You send them out into the Army, or you send them anywhere; they have a class feeling; a feeling of superiority, which is a thing altogether natural. They can not help feeling it. But the infantryman, driving along with his pack on his back realizes that the object of all war is to get the Infantry to a particular place. Everything else is aimed at the accomplishment of one object, and that is to get the Infantry forces into the occupation of the enemy's territory. That is the object of everything else. The infantryman plods along the highway, and he is shot at by a machine gun; presently one of the eagles sends him down a message, "Why do you not hurry up?" and instantly the infantryman says, "He is riding up there and having a good time, while we are tramping along dirty roads," and he has a feeling against the Air Service, and the Air Service feels naturally that the man who plods along the highway is a pretty slow sort of fellow. But that is the ordinary human thing.

I think, Mr. Fuller, if I may make one more observation, quite seriously, I think there will be less of that as the Air Service is more and more intimately and constantly associated with the Army, and if you separate them you increase it.

If you had a separate Air Service of the extreme type that has been suggested by some bills which have been introduced, and the commanding general of a force sent to the Director of the Air Service and asked for 10 squadrons, and they came in by designation of the Director of the Air Service and not by reason of previous intimate association with the soldiers, there would be a difference between them more marked than there is now. But if in the subsequent training of our men they are all trained together and there is constant association, and constant recognition of the interdependence of the various arms of the service upon one another, so that the men in the air have certain duties toward the men on the ground, and the men on the ground have certain duties toward the men in the air, and they all realize that they are parts of one machine. That is what you want in war.

Mr. FULLER. I would like to ask how valuable the work of the airplane is in correcting or directing the fire of artillery?

Secretary BAKER. Very valuable.

Mr. FULLER. That is probably an ignorant question.

Secretary BAKER. Not at all. The development of the Air Service in mapping the enemy areas by means of photographic apparatus is practically indispensable in modern war.

Mr. FULLER. I realize that, but I mean in correcting artillery fire, in the matter of observation.

Secretary BAKER. I have no doubt it is of the very greatest value. Gen. Menoher can give you some expert advice on that subject.

Mr. CALDWELL. Mr. Secretary, most of the severe criticism of the Army brought against the Air Service—I was not present when the testimony was given, but a member of the committee has told me about it—is the complaint that the men who actually fly, the aces of our Army, were so frequently called upon to do service which it was physically impossible for them to perform by reason of the fact that the men calling upon them to do that service did not know the limitations of the Air Service. For instance, a lighter machine would be ordered out to protect a heavier machine in a bombing raid, and the lighter machine carrying a four-hour's supply of fuel would get ahead and be a considerable time in the air when the others started, and by the time they got together the fuel of the lighter machine would be practically run out and they would have to come back.

Mr. LAGUARDIA. The heavier machines had more fuel.

Mr. CALDWELL. The lighter machines would have run out of fuel before the operation would have really started. It was also said that they were called upon frequently to make flights during a time when the weather conditions were such that they could not fly without extreme peril, and when they did make flights the conditions were such that they could not perform their function and make observations in a fog or in rain; and the argument was made that if we had a separate Air Service, when the commander of the Air Service was called upon for action of that kind he would be a man of relative rank with the man calling for the action, and he would refuse to send his men on such a hazardous undertaking.

Secretary BAKER. I think that argument is foolish, to say the least of it. It is suicide before it gets started, if it is aimed in the direction of an independent Air Service. What we want in the Army is a commanding general who has been a flier, if we can get one. If a division commander has been a flier and knows the limitations of the Air Service, he will never make an impossible request.

Mr. CALDWELL. You think those things will gradually iron themselves out as the young men who get too old to fly come back into the other branches of the services?

Secretary BAKER. Quite so. If you let such a man stay in an independent Air Service, you have a situation where a commanding general has no authority at all over the men who fly. He will send a polite request that, "If the weather is of the right kind, please perform this thing for me."

Mr. CALDWELL. It would be a good thing to have a course in aviation in West Point?

Secretary BAKER. Undoubtedly.

Mr. CALDWELL. Have we such a course there now?

Secretary BAKER. I do not know about that. I do not know that a course in aviation at West Point would be particularly valuable to an officer. West Point is getting more and more to be the primary school for Army officers.

Mr. OLNEY. Are you in favor of a school of aeronautics, something after the type of school of fire and other schools of that kind?

Secretary BAKER. Undoubtedly, after the style of the school of fire, a sort of postgraduate school.

Mr. CALDWELL. Have you had any study made as regards the authority of Congress to delegate to a board the control of aviation, either intrastate or interstate?

Secretary BAKER. No; I have not, Mr. Caldwell.

Mr. CALDWELL. As a lawyer you know that we are taught from the beginning that property rights extend from the center of the earth to the dome of the heavens. Yet the earth turns around and there is a slice of the pie that changes every instant, so that what a man owns up there is ever shifting.

Secretary BAKER. He owns it all, finally.

Mr. CALDWELL. Either all or none.

Secretary BAKER. He owns in the great circle.

Mr. CALDWELL. The question in my mind is as to whether or not we would have the authority to delegate, for instance, to the Department of Commerce, the right to regulate service in the air by reason of the fact that the Constitution limits the power of Congress to legislate as to only those things that have been surrendered by the States, and if there is a personal property right that goes to the dome of the heavens, certainly there must be a State right, and about the only thing we could regulate would be interstate operations.

Secretary BAKER. I think whatever regulation you undertake there would have to be under the interstate commerce clause as a matter of the regulation of interstate commerce. That, however, is an entirely different question from the impairment of individual property rights which extend to the sky.

Mr. CALDWELL. Has there been any study made of that subject?

Secretary BAKER. There has been none that I know of.

Mr. CALDWELL. Has there been any question brought up through the State Department which has been called to your attention in regard to the power to control aviation in the use of foreign machines across our territory?

Secretary BAKER. The State Department had a series of resolutions or regulations which were proposed by an international group, and they were submitted to Mr. Crowell, with the hope that he would have the gentlemen associated with him on the mission of which he was the head express their views about them, and they have done that, as I understand it; but whether they have ever transmitted those regulations to Congress I do not know.

Mr. CALDWELL. You referred in a confidential statement you made to the committee to a conversation you had with foreign gentlemen to the effect that wars can not be won in the air. It might also be true that a war can not be won on the sea, except with some minor nations, when we had an overwhelming naval force.

Secretary BAKER. I would like to correct that. The distinguished officer who was quoted merely said that aircraft was not going to win this war. It is entirely possible that aircraft will develop so that some day it will control. I think it entirely possible to have the Navy end a war. The American Navy ended the Spanish War, I should think.

Mr. CALDWELL. They only made it possible for the land forces to stay on the island because they prevented them from being cut off from their base of supplies.

Secretary BAKER. They extinguished two hostile fleets.

Mr. CALDWELL. When the Navy has cut off the source of supply it has finished its job?

Secretary BAKER. Yes.

Mr. CALDWELL. The proponents of a separate air service liken the Air Service to the Navy. They say when we start in a war the first thing is to sweep the sea of the enemy's ships and cut off its connections with its army. They say that we must get ready so that when the next war comes we will be able to sweep the enemy from the sky for exactly the same reason that we sweep the enemy from the sea, and that by reason of the fact that the Navy has demonstrated its efficiency and the necessity of having it operate as a separate service we ought to learn a lesson from that and organize in air as we have organized a separate service on the sea. Do you see any parallel there?

Secretary BAKER. No; I do not. I think there is a total failure of parallels.

Mr. CALDWELL. Would you favor granting to the Department of Commerce the power to regulate or to establish rules for the interstate navigation of the air, commercially or otherwise?

Secretary BAKER. I should think that would be a proper function for the interdepartmental board.

Mr. CALDWELL. Each member of the board would have his own interest to look after.

Secretary BAKER. I think the administration of that might very well be done through the Department of Commerce.

Mr. CALDWELL. And inspection also?

Secretary BAKER. Inspection of commercial aircraft.

Mr. CALDWELL. For the carrying of passengers and freight.

Secretary BAKER. I mean excluding the Army and the Navy.

Mr. CALDWELL. Other governmental activities?

Secretary BAKER. Yes.

Mr. CALDWELL. How much control would you give the Department of Commerce over the use of aircraft in commerce? Would you give them as much supervision as is given the Interstate Commerce Commission over the railroads and common carriers?

Secretary BAKER. I do not think that would be necessary. I do not think it is necessary to regulate prices. That would not seem to be necessary yet.

Mr. LAGUARDIA. You would have their supervision more like that of the Steamboat Inspection Service?

Secretary BAKER. More nearly analogous to that. I think there ought to be somebody charged with the authority to prescribe restricted areas over which machines would not be allowed to fly. I think flying ought not to be allowed over large cities.

Mr. CALDWELL. In the connection with the manufacture of airplane material, would you have the inspection service go into the factories and to a certain extent supervise or limit the character of construction?

Secretary BAKER. I think I would.

Mr. CALDWELL. Have you ever thought of the possibility of permitting the organization of commercial companies to operate under a monopoly? For instance, would you favor the passage of a law that would give some department of the Government the power to lay out air lanes between certain prescribed points, say, between great cities and say they could operate for a certain time, giving them a monopoly for a certain period to operate between those cities?

Secretary BAKER. I would not do that.

Mr. CALDWELL. That would tend to stimulate investment, would it not?

Secretary BAKER. I do not think so. I think the whole business of development in the air is too new to burden it with restrictions of that kind.

Mr. CALDWELL. In the Navy we find they are actually operating to a limited extent some factories that grew up during the war. But in the Army all the factories have been shut down. Why that difference?

Secretary BAKER. Appropriations.

Mr. CALDWELL. No; you have the appropriations.

Secretary BAKER. I can not answer that. I assumed we were spending all the money you appropriated. Gen. Menoher can answer that question.

Mr. CALDWELL. You have in Long Island City one of the finest machine shops in the world. From a mechanical standpoint I do not think there is anything better anywhere, and yet that is shut down.

Secretary BAKER. I can not answer that question.

Mr. CALDWELL. We have made appropriations for new material, to a limited extent.

Secretary BAKER. Is that a Government plant?

Mr. CALDWELL. Yes.

Secretary BAKER. Then I assume, without knowing anything about it, that the Air Service is spending that money you appropriated on private manufacturers.

Mr. CALDWELL. Practically none, I think, now.

Mr. LAGUARDIA. It is being used more for labor than for anything else.

Secretary BAKER. In protecting the custody of existing property.

Mr. CALDWELL. We have recently purchased the Curtiss airplane plant, or passed an appropriation for that purpose in the House, authorizing it. The House refused to appropriate any money to purchase the Dayton-Wright plant, although that will probably be put on in the Senate. Is it going to be your policy to advocate keeping those plants shut down?

Secretary BAKER. Not if you will give us the money to operate them.

Mr. CALDWELL. In the future acquisition of air craft, do you think it would be better for us to manufacture all our stuff, a part of our stuff, or none of our stuff that we use for governmental activities?

Secretary BAKER. You are referring to the manufacture of airplanes?

Mr. CALDWELL. Yes; and engines and material of all kinds.

Secretary BAKER. Forecasting as much as I can what I think is likely to occur in the matter of appropriations for the Air Service generally, I should say as largely as possible we ought to buy from private manufacturers.

Mr. CALDWELL. That has been the attitude of the private manufacturers and some men in the department who have testified before the committee. But I call your attention to the fact that for some years prior to the war there was a contest between Congress and the department as to whether or not Government material should be manufactured in Government plants or bought from private plants, the argument being, on the department side, and by Gen. Crozier particularly, that if you did not stimulate private enterprise by giving private plants Government orders, when we got into war we would not have any place from which we could get material, and that it would be hopeless to think of building a Government institution big enough to take care of our needs in time of war.

With that in view, Gen. Crozier spent several million dollars we appropriated with the expectation of having material made at our arsenals for other small arms instead of those we had appropriated for and shut down the Government arsenals. When we got into the war we found he had not stimulated any private enterprise, and we had to start up our own plants and grant Government aid to private enterprise to extend its factories. Dou you not think we will have the same conditions in the matter of aircraft?

Secretary BAKER. Let me comment on that for a moment. Experimental orders given by the Ordnance Department with a view to building up facilities in the country which could be used in an emergency undoubtedly served a very useful purpose. There were agencies in this country which, if our allies had not been absorbing them, would have been able to have been of very great service to our Government in the turning out of arms. Companies which had had experimental orders had all been employed by our allies

and many very much larger plants were turning out arms for them, so that when we came into the market for increased facilities we came into a market where all the facilities which had been created through the medium of Government orders had been absorbed by our allies and we had to build new facilities.

Mr. CALDWELL. One of the most glaring cases that we had was the case of powder. We could not get the powder we wanted from the concerns we had given orders to for many years, and we had to build powder factories.

Secretary BAKER. Because the facilities which we had created by our encouragement in giving them orders were being used by the French and the British. The Du Pont Co. had orders for hundreds of millions of pounds from the British and the French. If we had gone into the war earlier the Du Pont Co. would undoubtedly have been able to have supplied us with a very large amount of powder.

Mr. CALDWELL. If we had not had some Government plants we would not have been in a position to start to get our supply from Government plants.

Secretary BAKER. I agree with you perfectly. I think the value of the Government powder plant was unquestionably demonstrated. I think the powder plant we had at Picatinny Arsenal—and the Navy had one at Indianhead—saved this Government—I want to be very modest about it—$60,000,000, which we can prove.

Mr. CALDWELL. Do you not think it would be better, taking that as an expeirence, that we should at least operate our aviation factories—that is, our aircraft machinery factories—to a limited extent, at least?

Secretary BAKER. Undoubtedly, for two purposes, for the carrying on of experiments of a highly secret character, and also to obtain a level by which we can control prices.

Mr. CALDWELL. And in a place where we can have the jigs and dies and things of that sort made in surplus quantities so that we can expand our facilties by loaning those things to private enterprise?

Secretary BAKER. Undoubtedly.

Mr. FISHER. Did not the Aircraft Board during the war operate as a stimulating agency along the line of production of aircraft, and also as a coordinating agency between the War Department and the Navy Department?

Secretary BAKER. Yes, sir.

Mr. FISHER. Does the aircraft board operate now, Mr. Secretary?

Secretary BAKER. Not the old aircraft board?

Mr. FISHER. Is there an aircraft board functioning now like the aircraft board functioned during the war?

Secretary BAKER. It is not identical with that board. We have a joint Army and Navy board on aeronautics, and that board is taking up all questions of conflict of design, all questions of conflict of jurisdiction, and all questions of duplication, and is assigning to the Navy the thing that is best for the Navy to do and assigning to the Army the thing that is best for the Army to do for both services.

Mr. FISHER. A good deal has been said by witnesses who have appeared before the subcommittee as to the cause for the delay and

the breaking down of the Air Service. Is it not a fact that the aircraft board had practically unlimited sway, that their recommendations were almost always followed by the War Department and the Navy Department, where they had gone carefully over the situation?

Secretary BAKER. Without exception, so far as I know.

Mr. FISHER. So, as a matter of fact, in the last analysis, the aircraft board was, as far as the war was concerned, a separate air service in many senses of the word?

Secretary BAKER. Practically.

Mr. FULLER. Too much so?

Secretary BAKER. Probably.

Mr. FISHER. If Congress should see fit to create a department of the air, such as that outlined in the bill introduced in the Senate by Senator New, it is claimed that we would, by creating such a department, bring about a tremendous stimulation and process of development along technical lines in the matter of aircraft. My thought is this, do we run the risk of decreasing the efficiency of aviation as a fighting arm of the War Department?

Secretary BAKER. Unhappily, I do not have the details of Senator New's bill in my mind, but anything which either separates the personnel of the Air Service from the Army, or takes away from the Army the determination of the relative importance and the relative uses of aircraft to the other arms of the service, or the designing of aircraft or the training of military aviators will decrease the efficiency of the Air Service as a military arm.

Mr. FISHER. Congress should certainly bear that in mind in the adoption of any policy of improvement in connection with aircraft, that they run the risk of decreasing the efficiency of the Air Service as a fighting arm.

Secretary BAKER. Yes; I think so.

Mr. FISHER. A good deal has been said by witnesses who appeared before this committee relative to what is alleged to be the reckless discharge of splendid flying officers. I would like to know whether or not a great majority of the officers did not want to leave of their own motion?

Secretary BAKER. A large majority of them. I want to ask the members of the committee whether they will not do me the courtesy to read my annual report, because I have stated in there, as carefully and as fully as I can, the arguments of the department on both sides. I realize there are arguments on both sides.

Mr. HULL. Mr. Secretary, in case we were to create a separate department such as Senator New has in mind and such as proposed by Mr. Curry in the bill he introduced, with a separate Cabinet officer at the head of the department, having an entirely separate executive department to control the aviation program, have you figured at all what the additional expense would be?

Secretary BAKER. You mean the mere administrative expense?

Mr. HULL. Yes.

Secretary BAKER. That would not be serious. But the expense that would give that department enough to do to justify its existence would be very great—many hundreds of millions of dollars.

Mr. HULL. There would be probably some increased personnel and some promotions?

Secretary BAKER. There would be that; but the salary of the Cabinet officer at the head would be a mere bagatelle, and the salaries of the few clerks he would have to have about him would amount to nothing.

Mr. HULL. Would he not almost have to have a staff?

Secretary BAKER. Yes.

Mr. CALDWELL. There would be a duplication of service?

Secretary BAKER. Undoubtedly.

Mr. HULL. Would that be more than expensive?

Secretary BAKER. Not as compared with the amount you would have to appropriate to encourage commercial aeronautics.

Mr. HULL. My idea was——

Secretary BAKER (interposing). When you are stacking up tools that cost $25,000 or $30,000 practically every day, when the life of that tool is a very limited number of months, when you get the total of all that you are running into expenses of a perfectly prodigious character.

Mr. HULL. The aditional expense, if you create that department, in the line of additional staff officers and additional promotions, as I look at it——

Secretary BAKER. Of course, it would be very great, and it would have this bad effect, if you create a separate air service and give promotions in it, giving the officers in the air service an advantage over officers in the other branches, you will create such dissatisfaction in the Army and the Navy that it will have a very bad effect on the esprit de corps. It is very difficult now to keep men in the Army and the Navy.

Mr. HULL. There is a very strong sentiment that the aviation corps ought to be composed of men with actual flying experience and not some one who has just learned to fly.

Secretary BAKER. You mean the Chief of the Air Service or the Chief of Aeronautics?

Mr. HULL. Chief of Aeronautics.

Secretary BAKER. I am inclined to agree with that.

Mr. HULL. Or the Chief of the Air Service.

Secretary BAKER. I can see the reason for that.

Mr. HULL. There is no criticism against Gen. Menoher or anybody else, but there is a general feeling among the personnel in the Air Service that the men who have been at the head of the service have been thinking more about the Artillery or more about the Cavalry than their particular corps; that those men have been put into that position without having had sufficient experience, men who have not been actual fliers, and that their first love is their strongest love, and they feel that that has been one of the mistakes. Of course, that can not be cured for some years.

Secretary BAKER. Eventually we will develop in the Air Service men of the type you refer to who will be so appropriately fitted to be heads of the Air Service that they will be heads of that service.

Mr. HULL. The other day we had up the question of the purchase of the North Elmwood plant of the Curtiss Co. and of the Dayton-Wright plant. You believe, do you not, that it is a wise thing for the Government to take over those plants?

Secretary BAKER. I think it is wise for the Government to take them both.

Mr. OLNEY. If we purchased one, would you consider the other also necessary?

Secretary BAKER. I would not say that they are so related that they are dependently necessary. If we can only get one, we would be glad to get that.

Mr. LAGUARDIA. We both agree that the producer and the user of the aircraft equipment should be the same authority. You pointed out the difficulties in connection with ordnance, and the difficulty in having one department create the planes and having another department use them. Would that not be an argument in favor of concentrating it all in one department?

Secretary BAKER. I think not.

Mr. LAGUARDIA. Could not the postgraduate school you referred to take care of both the Navy and the Army pilots?

Secretary BAKER. I do not think it ought to. I do not think that work of the naval officers ought to be merged in an Army air school; it is too important. There are many things we can do and we ought to do them jointly where we can.

Mr. LAGUARDIA. In regard to the question of appropriations, we will have to appropriate large sums of money if we want to do anything at all in aviation.

Secretary BAKER. Yes.

Mr. LAGUARDIA. Would not some economy be exercised if we put that all under one jurisdiction?

Secretary BAKER. I can not see that. I think it is possible there might be economies, but as I see it it might be at the expense of efficiency.

Mr. OLNEY. Your idea, practically, is not so different from our own?

Secretary BAKER. I do not think it is, if I understand your idea. We are all trying to build up the Air Service. I am putting special accent on the part that interests me. That is between Mr. Crowell's views and mine. Mr. Crowell is interested in the Air Service generally; I am interested in a military air service.

Mr. OLNEY. If you can arrive at the same conclusion through the work of an interdepartmental board I do not know but we might accomplish the same purpose.

Secretary BAKER. My duty and my interest in this matter is to make the Army of the United States the most efficient fighting instrument it can possibly be made. I believe its efficiency can only come from having it a consolidated thing, both in spirit, training, and experience.

(Thereupon, the subcommittee took a recess until 2 o'clock p. m.)

AFTER RECESS.

The subcommitte reassembled pursuant to the taking of recess at 2 o'clock p. m.

STATEMENT OF MAJ. GEN. CHARLES T. MENOHER, CHIEF OF AIR SERVICE.

Mr. FISHER. General, will you please state your rank and your present position?

Gen. MENOHER. Major general, chief of Air Service.

Mr. FISHER. Have you been serving on a committee or a board which had as its object the study of the bills which have been introduced in Congress relative to the creation of a separate air department or air service.

Gen. MENOHER. Yes.

Mr. FISHER. I will ask you to state whether or not you have carefully examined the bill introduced by Senator New?

Gen. MENOHER. I have not examined the most recent bill which I understand he has introduced, but we did examine the original bill introduced by Senator New.

Mr. FISHER. Was the Curry bill the other bill which your board had under consideration?

Gen. MENOHER. Yes.

Mr. FISHER. The board of officers of which you were a member reported on the New bill and the Curry bill?

Gen. MENOHER. Yes.

Mr. FISHER. Did that board find in either one of those two bills provisions for a department of the Air Service which they fully approved?

Gen. MENOHER. They did not.

Mr. FISHER. I would like to have you state, General, wherein a separate air service as provided for by these two bills is not satisfactory, in so far as the efficiency of the Air Service is concerned, as a fighting branch of the Army.

Gen. MENOHER. In the first place, I believe we should look at this matter in connection with an air service from the standpoint of the national defense rather than from the commercial standpoint. I consider that the national defense is fundamental and primary, and that the commercial feature of it is incidental.

Looking at it from that standpoint, I feel, as Secretary Baker expressed this morning, that my duty is to do everything possible to make the best fighting machine that can be had for the national defense. That means the best Infantry, the best Cavalry, the best Artillery, and the best auxiliary services all through the Army, including the Air Service.

There are two or three things for which I am contending in this matter of a separate Air Service. One is that we should look at it from the standpoint which I just referred to.

Another is that the forces that fight with the Army should be an integral part of that Army. We might as well acknowledge that there have been differences and lack of sympathy between the ground troops and the air. The ground troops said that the air people got more money than they did, or than anyone else did, and did less work. The air people said they were not understood by the ground troops, that they had special problems calling for special regulations and special treatment, and that the ground troops were out of sympathy with them. So there has been a lack of cohesion between the Air Service and the other branches of the Army.

To my mind, to separate the Air Service from the rest of the Army at this time would be to make that line of cleavage between the two services absolute, and it is my belief that we would never get any coordination or cooperation or any sympathy as compared

with what we can get if we make the union more close than it is now.

Those who were on the other side saw how things were going and realized that the best coordination was obtainable, and was only obtainable, when the Air Service was operating with the Army and was required to go along with the ground troops. I have that statement from Gen. Mitchell, who was commanding the air forces in the St. Mihiel salient, when I had command of a division in the center of that push. We got cooperation there because we got more intimate coordination between the ground troops and the air troops than we had before or afterwards.

I consider that it would be a fundamental mistake to separate the air forces that fight with the Army from the Army itself. The men must be first of all Army officers, just as the Navy contends that every one of their officers should be Navy officers first and their specialty comes second.

Another thing that I am contending for is that the Army and the Navy should carry on their own experimental development of planes. They have special needs which are entirely distinct from those of the commercial planes. Mr. Praeger, the Second Assistant Postmaster General, recently said he did not want any military aviators in his mail-carrying planes. It is only in the bomber, and to a very limited extent in the observation plane, that we want the characteristics of the commercial plane. We want above all things a maneuverable plane and a speedy plane, one that is as cranky as you please for fighting purposes, which depends on the skill of the aviator. We do not want any stabilizers on those machines. That was very well expressed by the Secretary of War this morning.

If the Army is not allowed to carry on its own experimental engineering development, that is, to develop types needed for the peculiar service required by the Army, we will find ourselves one of these days without any accomplished progress in the matter of the development of those planes.

If we have a separate Air Service with a civilian head, who is very likely to give at least due prominence to the commercial end of it, the particular peculiar needs of the Army and Navy will be lost sight of.

There is another thing. I believe—and I am convinced of this—that we must have an agency for production, so that when the type is once determined upon by our engineers and experts of the Army and the Navy and it has been tried out by our fliers, that then it should be turned over to this agency for production, and that agency will attend to all matters in connection with the production of that plane.

My ideas were expressed generally in the report of the board to which Mr. Fisher alluded, and more specifically in a bill we prepared, of which I think Mr. Hull has a copy. We provided in that bill for a Director of Aeronautics, and according to the provisions of that bill he would report direct to the President.

Mr. MORIN. That is incorporated in the Hull bill?

Gen. MENOHER. Yes. In that respect our bill differs from the idea of the Secretary. We provide that this Director of Aeronautics

would have charge of all international relations so far as the air is concerned, and of interstate commerce matters in connection with the air, of rules and regulations for the navigation of the air, licensing of pilots, and all of those matters which must be handled by some central agency. These are all activities outside of the Army and the Navy, and this Director of Aeronautics would be assisted by a board of control, one member to be selected as a representative officer from the Air Service of the Army, one from the Air Service of the Navy, and one to represent the civilian activities and the commercial activities. Those men would form a board of control to assist the Director of Aeronautics and to coordinate with this production agency all matters affecting the Army and the Navy; that the Army should retain its personnel and the Navy should retain its personnel and so forth.

There is nothing in the bill as it is drawn that precludes the idea of the creation of an independent Air Service for special needs. There is no question but that in the future the airplane is going to play a most important part in any war we may have. I agree with Secretary Baker absolutely that the Infantry is the one determining factor in any war; it was in the last war, and it was in all wars that went before, and it is going to be the determining factor in any war that comes in the future. But there are certain contributing factors such as the Artillery, the Tanks, the Cavalry, and the Air Service. I am willing to admit—and I have always been an artillery man and I have always looked upon it as the chief auxiliary branch to the Infantry—I am willing to admit that the Air Service is going to be, perhaps, a more important adjunct to the Infantry than even the Artillery. But no man can say definitely what is going to be the future development of the Air Service in that respect.

Mr. FISHER. It is claimed by a number of witnesses who have appeared before the committee that if a separate Air Service with a Cabinet officer at its head, or created as a separate executive department, is provided for by Congress, there will be a stimulus given to aviation such as could not be given in other ways. In the Hull bill which you have referred to, is it provided there that the Department of the Air Service created under that bill will stimulate the production and development of aviation?

Gen. MENOHER. I do not see how we can avoid that conclusion, that there is going to be as much of a stimulus as there would be if we had a Cabinet officer at the head of such a department.

Mr. FISHER. The bill introduced by Mr. Hull, a member of this committee, has your indorsement?

Gen. MENOHER. I am not certain that the Hull bill embodies the provisions we had in the bill we prepared. Col. Fuller may be able to tell you that.

Col. FULLER. It does not.

Mr. FISHER. Can you furnish us with a copy of a bill that does meet with your ideas of what a separate air service should be?

Gen. MENOHER. This is a copy of our bill. It is not the same as the original bill of Mr. Hull. This is the bill we prepared following the ideas of the board that Mr. Fisher spoke of. I would like to say this, Mr. Chairman: This bill makes no attempt to go into

the organization of a fighting force of the air that would be attached to the Army. So that this is not complete in that particular respect. This bill deals really only with the fundamental idea as to whether or not we should separate this force from the Army or from the Navy, or should not. The other matter is being worked out, and if this should go into effect we are prepared to submit another scheme for the forces that would belong to the Army.

Mr. MORIN. I think that is as far as you can go, dealing with the fundamentals first.

Gen. MENOHER. We can not settle all these things for all time right now. It is a very new thing. It has only been a very few years since the first plane was flown. We have not much history behind it. The development was revolutionary during the war. We are not going to have any further revolutions in the development of aircraft. It will be slower than some think it should be.

I maintain that the industry was brought into being during the war and that we must do something to keep that child alive. But it must show by its growth some justification for its continued existence, because otherwise, under the ordinary law of the survival of the fittest, it will have to be abandoned. We can assist it to survive by being fairly liberal with appropriations; and if we have only fairly liberal appropriations there are a number of factories in this country that will continue their plants so that they can go into production in case they are called upon. We are only now altering a number of De Haviland planes to make them more safe and improve them generally, and we are able to farm that work out and get it through quickly, by giving it to five different manufacturers. They are working on that now, so that the industry has not entirely gone out of existence, but it is hanging on the ragged edge.

There is nothing in this bill that precludes the organization of an independent air force to go out into the enemy's area each hour in the day and do bombing.

Mr. FISHER. You think at the same time it preserves the spirit of coordination, cooperation, and teamwork among the different branches of aviation?

Gen. MENOHER. I would like to illustrate the matter of coordination in another way. We have for national defense now the War Department and the Navy Department, and by virtue of having two of those departments, there is bound to be some lack of coordination, because it is a human activity, and if there was no lack of coordination and cooperation it would not be human. If we introduce a third activity for national defense so that we have the land, the air and the water, we are not only going to increase the lack of coordination or increase the number of points where there is not contact, but the increase in the possibilities for lack of cooperation and coordination will be as the square of the number of activities represented. You can not get away from that. To my mind you will only be increasing the trouble if you introduce another department for national defense.

Mr. MORIN. There is nothing in your bill that will prevent the Air Service from operating independently, beyond the range of either the Army or the Navy?

Gen. MENOHER. Absolutely nothing. If I had that bill as it stands now and organized this Air Service, one of the first acts

would be to create an independent air force that would be available to go over the top at the hour and permit them to go ahead.

Mr. FISHER. Have you any idea as to the possible difference in the cost to the Government under the bill you have presented and the bill which creates a separate executive department, with a Cabinet officer at its head? Is there any way of estimating what the overhead would be in case a separate department were established with a Cabinet officer at its head?

Gen. MENOHER. It seems to me if we create a separate department with a Cabinet officer at the head of it, all the auxiliary activities necessary in the creation of that department are going to be just that much overhead added to what we have now. And if we have a separate department under a Cabinet officer, he will have to have certain staff bureaus just as the War Department has. There will be an executive office, with all that pertains to that, there will be an ordnance office and an engineering department, with all that pertains to that; and it seems to me those would be added to the overhead you have now. We have the machinery in the Army and the Navy for carrying all that on without the creation of a new department along that line. So it seems to me that is all added to the present cost.

There is no duplication in the matter of planes. If the Army is to make planes it must have the activity; if the Navy is to make planes it must have that activity, and there is not going to be any increase or decrease in the matter of the number of planes that are going to be required, except perhaps in the matter of primary training planes.

Mr. FISHER. It has been suggested here that the flying officers who served during the war, who had efficient and brilliant records have been permitted to leave the service, without giving very careful consideration to their desire to remain in the service. Can you tell us what has been the policy of the Bureau of Military Aeronautics along that line?

Gen. MENOHER. About the 1st of August, as I recollect it, we had in the service about 4,200 officers. Then came the bill fixing the number of officers in the emergency army at 18,000.

Mr. FISHER. That was done by act of Congress?

Gen. MENOHER. Yes. That bill provided for the retention in the Air Service of 1,200 emergency officers, who belonged to the class you speak of, and of those 1,200 85 per cent had to be flyers. We had at the time the bill was first introduced about 3,800 emergency officers, so that we had to reduce the number of officers from 3,800 to 1,200. We made up priority lists, taking in the opinions and recommendations of all those who were supposed to know most about the records of the officers, and we took the officers to make up that number of 1,200 from the top of that list.

Mr. FISHER. Those who had the most efficient record?

Gen. MENOHER. Those who had the most efficient record. The training and operations group, which is composed always of flying officers, with Gen. Mitchell at the head of it, made up a priority list of flying officers.

Mr. FISHER. And the permanent list was selected from that, beginning at the top?

Gen. MENOHER. Yes; beginning at the top.

Mr. FISHER. Did a great many of the efficient officers leave the service because they were able to get higher pay in civil life?

Gen. MENOHER. There were some. In the Army generally there are a great many men resigning right now because they say they can not live with the rates of pay they get.

Mr. FISHER. You retained as many of the efficient officers as the law required?

Gen. MENOHER. We could retain 1,200, and no more, and we had to dispose of all the rest of them.

Mr. FISHER. Most of those who were discharged because of the fact that there were not places for them are in the Reserve now, are they not?

Gen. MENOHER. Most of them are in the Reserve; yes.

Mr. LAGUARDIA. Do you approve of this bill?

Gen. MENOHER. That is the bill we wrote, following the recommendations of that board of general officers of which I was a member, and of which Mr. Fisher just spoke.

Mr. LAGUARDIA. On page 2, line 21, it says, "The President is hereby authorized to transfer to the Department of Aeronautics"—and so forth. Would you object if that were changed to read, "The President shall transfer?"

Gen. MENOHER. I think that ought to be left as it is. We went over that very carefully, and our idea was, why make the transfer if it is going to be made right back. It is a matter of adjustment rather than of orders. I think you should not make it hard and fast.

Mr. LAGUARDIA. What do you do with the personnel in your bill?

Gen. MENOHER. We keep it with the Army. I am for the retention of the personnel that fights with the Army, and the closer we get them together the better it is.

Mr. OLNEY. Does this bill meet with the sanction of the Secretary of War?

Gen. MENOHER. I think not, generally, because we followed the ideas of that board of general officers of which I was a member, and the Secretary of War did not approve of that report in its entirety. He did not approve of the idea of having a Director of Aeronautics as the head of a department or bureau that would report direct to the President. His idea was that the President has enough to do now.

Mr. CALDWELL. He thought it ought to report to a board composed of the Cabinet officers affected?

Gen. MENOHER. Yes. But I do not think the difference is one on which we should split.

Mr. OLNEY. You spoke of the duplication in the matter of ordnance. Would your bill eradicate this?

Gen. MENOHER. We do not touch on that specifically. We are not trying to settle all the details.

Mr. OLNEY. I gather that you rather approve the general idea of a united air service?

Gen. MENOHER. I am unalterably opposed to the separation of the personnel that fights with the Army from the Army itself. The first thing we should do is to look at this thing from the standpoint of national defense, which we consider fundamental, and not from the standpoint of the commercial end of it.

In the second place, we do think that the fighting forces of the air should belong to the Army or to the Navy, whichever they fight with; that the Army and the Navy should carry on its own experimental and engineering development, development to suit the particular needs of the Army and the Navy, and that when the type that is wanted is developed and approved and ready to go to production, that then it should go to the production branch, which would be in the hands of the director; that we should then have an agency to handle all matters of production; that the director would be the one to handle international relations and handle the matter of regulations and rules in regard to the conduct of the navigation of the air, the licensing of pilots, and all matters of that kind; that he would be assisted by a control board—I do not like to use the word "board," but I do not know of anything better—a body of control, one of whose members would be from the Army, who would be a representative Air Service officer from the Army, and another representative Air Service officer from the Navy, and the third member to be appointed by the Director; who, as I recollect, would look after the civilian and commercial end of it; and that these men would form a control board and each one of them would coordinate the work of that board with his own service. That gives you, in general, an outline of the scheme we have included in this bill.

Mr. OLNEY. The New bill reported by the Senate Committee on Military Affairs would not meet with your approval?

Gen. MENOHER. Not entirely. I think it would be fatal to separate the personnel that fights with the Army from the Army itself. There is nothing in this bill that we have drawn that precludes the idea of the creation of a fighting air force, a separate air force that would go out and bomb the enemy army at the outbreak of war. That would be one of the first things I would take up if I had the organization of the air force under that bill, that is, the creation of an independent air force.

Mr. MORIN. They would operate independently, beyond the range of the Army artillery?

Gen. MENOHER. Yes; and probably beyond the range of the Navy, even.

Mr. LAGUARDIA. You would use Army personnel?

Gen. MENOHER. We would use Army personnel. I think the Army should have Army officers as Air Service officers.

Mr. LAGUARDIA. Under your bill you would acquire jurisdiction of the Postal Air Service?

Gen. MENOHER. Yes; it would really be handled by the civilian member of the control board.

Mr. MORIN. Will you tell us the names of the members of the board which made this investigation and approved this bill?

Gen. MENOHER. I was president of the board; Gen. Haan, Gen. Coe, and Gen. Snow were the other members of the board.

Mr. MORIN. You were president of the board?

Gen. MENOHER. Yes. We spent two months in studying that question and arrived at our conclusions after very considerable deliberation.

Mr. MORIN. And all the members of the board agreed upon this bill?

Gen. MENOHER. No; that was prepared in my office, following the report of this board which was agreed to by all the members of the board. But I think that bill will meet the approval of all the members of the board, although I can not speak definitely.

Mr. LAGUARDIA. Under this plan is there any reason why Army aviators could not be used for postal work, and other work of that kind?

Gen. MENOHER. Absolutely none; although I agree with what the Secretary said this morning about the danger of getting into bad habits, so to speak, by attempting to train airmen and keep them in training as commercial fliers and available for use as military fliers.

Mr. FULLER. What would you advocate using them for? I could see his objection this morning. What would you use them for, that is, in order to keep the fliers in proper trim?

Gen. MENOHER. We can have enough work of our own to keep the fliers busy. We did an immense amount of work this summer on forest patrol on the Pacific coast. We covered all those forests.

Mr. FULLER. Why could not that well be preliminary work, and also the carrying of mails?

Gen. MENOHER. But as I say there is danger of acquiring bad habits.

Mr. FULLER. What do you mean by that?

Gen. MENOHER. Bad flying habits. You do not want that sort of flyer; he is a slow flyer.

Mr. FULLER. Why could he not graduate as soon as he was able to do this job satisfactorily?

Gen. MENOHER. It is possible we will have to do that, because we will have to dispose of some of our flyers in the lower grades. I think in any organization we can devise we will have to dispose of some of those flyers in the lower grades because there would be an excess of officers in the lower grades over what we would have in the other branches of the service, and you have got to have the promotions more or less in the same proportion; otherwise there would be dissatisfaction over the promotions in one service. There would be a feeling that the other fellow is no better than we are. Promotions ought to be equalized, as far as possible. I think we will have in any organization of personnel in the Air Service, whether in a separate Air Service or whether it remains with the Army, to arrange for the disposition of some of the men in the lower grades who will pass into the reserve for use in time of need. We do not know what proportion we will have to get rid of, although we can not keep them all. That is a question of development in the future. I do not think we should attempt to settle all these details right now for all time. We have not had sufficient experience; we have not sufficient perspective to enable us to settle all those questions right now.

Mr. LAGUARDIA. There is no doubt, if we were to enact this bill into law, that before many Congresses had passed, those people would ask for complete separation?

Gen. MENOHER. I do not think so.

Mr. MORIN. Would there be any objection to having this man at the head of the Department of Aeronautics report to the Secretary of War instead of to the President?

Gen MENOHER. That is advocated by a great many, and I am not unalterably attached to having him report to the President. I say we should have an organization such as we provide for in that bill. As to whom the head of that organization should report is another thing. He might report to the President, or perhaps to the interdepartmental board, or perhaps to one of the Cabinet members of that interdepartmental board.

Mr. MORIN. Suppose we follow out the suggestion and create that interdepartmental board?

Gen. MENOHER. That brings up the matter of primary training. Under that bill, as I understand it, the primary training would be carried on by the department; that is, the largest department which had the most facilities, and I think we would save very much by that. Take the situation at present, as between the Army and the Navy. The Navy asked for an appropriation for a number of training planes. I said, "Why do you not let us give your flyers their primary training; we have the facilities for doing it?" It was agreed to by Capt. Craven, who is the Navy member of this joint Army and Navy Board. He said, "Why should we not do it that way?"

As a result of that agreement, he cut out $500,000 from his estimate. We have the planes, we have the facilities; why not let us give the Navy flyers their primary training? There comes a point when you have got to get away from that and train the flyer in the specialty in the service in which he is going to be used. For instance, the Navy flyers must be taught to take off from the ship, from the water, and must be taught how to land on the water. I think it would be a safe rule to follow to provide that the primary training should be carried on by the activity which is the largest, and which has the most facilities for doing that work.

We have just prepared a letter to-day asking if the Navy would not take eight of our officers at Pensacola for a course in meteorology, and we are going to take 50 of their flyers at Dorr Field, in Florida, for primary training.

Mr. MORIN. It does not seem that there should be any objection made by that department.

Gen. MENOHER. No; we will save expense, and it will be a good thing, because the more we get together the better both for the service and for the officers.

Mr. LAGUARDIA. That is why we want to get you all together permanently.

Gen. MENOHER. You get back to the thing I consider absolutely fundamental, and that is that the force that fights with the Army should be an integral part of the Army iself. They should have the same traditions and the same rewards and punishments, and the same of everything. It is only then that you will get the coordination and sympathy and the liaison which is necessary to make a strong fighting team of our Army.

Mr. FULLER. Why could we not have a united air service board to take care of the designing and the manufacturing of the planes and the primary training? Why could not that primary training include such work as the postal work?

Gen. MENOHER. We can take care of the primary training in the Army because the Army is going to have a large force, and because the Army, in the nature of things, should retain such units as are necessary for their operation. We have figured out what forces we will require for the Army as it stands now for those operations. We have our insular possessions at Panama; we have our coast defense and all that pertains to that in the way of aviation; and then, we have 11 divisions of the mobile Army, and we would need certain units for operations. It would take 23,000 men to carry on those activities recognized as necessary to the Army for its operations.

Mr. FULLER. How many of those would be flyers?

Gen. MENOHER. I am speaking of the enlisted men; there would be about 2,500 or 3,000. Some day they are all going to be flyers. The time will come when every man in the Air Service will be a flyer. I consider that fundamental. That was one of the first things I announced when I came into the Air Service, that, all things being equal, the flyer should have the preference over the nonflyer; that the man who went over the line should have the preference over the man who had not gone over the line; and we have been trying to carry that out, although we have not always been able to do it.

Mr. MORIN. Did I understand you to say, General, that there would be no objection to providing for a report to an interdepartmental board, such as the one suggested by the Secretary of War this morning?

Gen. MENOHER. That I consider a more or less unimportant detail as compared with the other things.

Mr. MORIN. It would not, in your opinion, interfere with the functioning of this board?

Gen. MENOHER. No; I think not. I am contending that we must retain the personnel with the Army and the Navy, that the Army and the Navy must both carry on their experimental development to meet their own particular needs, and the development especially of fighting machines; and then we should have a central agency for handling the civilian end of it, and that matters of production be controlled by this central agency so that there will be no throat-cutting in the matter of production, as is liable to happen if each has his own way.

Mr. FULLER. So far as this experimental work is concerned, it is going to be of very considerable expense?

Gen. MENOHER. It is sure to be.

Mr. FULLER. Can you give us an outline of your idea about that?

Gen. MENOHER. I feel that it is not necessary for the Army and the Navy each to carry on its own experimental development altogether. We can combine on that and cut down some overhead expenses. The Army must determine the types it is going to use in its work. You can not let somebody else determine that. Then the Navy must determine the types it must have for its particular work. Having determined those types, the rest is simple.

Mr. FISHER. You think, then, that the problems that have to be met are somewhat different, although in some respects they are the same, but that when you come to production that can be done by some form of united control?

Gen. MENOHER. Yes.

Mr. FULLER. You are in favor of united control so far as manufacture goes?

Gen. MENOHER. Yes.

Mr. FULLER. And you feel as far as the experimental departments go that they must be separate?

Gen. MENOHER. Yes; because otherwise after the development has gone into the hands of the production department, they are going to lose track of the needs of the Army and the Navy.

Mr. FULLER. Could you not have a united experimental department?

Gen. MENOHER. Yes; you could have, but it would have to be so organized that the Navy and the Army would each be left with a free hand.

Mr. FULLER. They must have the utmost cooperation, but I can also see the possibility of great duplication.

Gen. MENOHER. Yes; I admit that. That to my mind, again, is not fundamental. It is a matter of adjustment.

Mr. FULLER. I was wondering how far you can go with a united service. We all go as far as manufacture, and then we commence to part company after the planes are constructed.

Mr. LAGUARDIA. Up to the primary training, I should say, before we start to part company.

Mr. FULLER. If it included designing and primary training it would accomplish a great deal because primary training, I should think, might properly include the work of all the departments. Would that be possible?

Gen. MENOHER. Yes; but I think the primary training would naturally fall to the Army. That is going to remain the biggest activity of all because the Army is going to remain the biggest single user of airplanes, whether there is an independent air service or not.

Mr. FULLER. What could we not include in the preliminary work, this post-office work? They are not subject to call in time of war?

Gen. MENOHER. No. That is another thing. The Army should determine its own reserve and the selection of men for the reserve should not be left to a civilian department, and the same thing applies to the Navy. They should determine the personnel of their reserve.

Mr. FULLER. Are not the qualifications about the same for the Army and Navy aviator?

Gen. MENOHER. Yes; but there are other qualities that have to be considered, such as the matter of personal preference. The question as to whether a man goes into the Army or the Navy is a matter of preference.

Mr. FULLER. How far do you say we can go with a united service, just simply in the manufacture, after you have decided on the design?

Gen. MENOHER. Yes; and then, of course, this central activity would look after international relations and all civilian relations, rules, and regulations concerning the navigation of the air, and rules for the licensing of pilots, which is a thing very badly needed. I took that up as soon as I came into the Air Service, but I have never been able to get anything definitely settled.

Mr. FULLER. I suppose if you had an experimental station, you would have something like the one at Dayton?

Gen. MENOHER. Yes.

Mr. FULLER. And the Navy would have a similar one?

Gen. MENOHER. Yes. They have split up their work and are carrying it on at their regular establishments.

Mr. FULLER. Where are those?

Gen. MENOHER. They have one at Philadelphia which is really the headquarters of their experimental engineering work.

Mr. FULLER. I am just wondering, by way of beginning, how they would combine the Navy and the Army in their experimental work. For example, you would want all the foreign planes you could get; you could learn more by looking over foreign planes——

Gen. MENOHER (interposing). No; I think we are up with the foreign designers. In fact, I think we are ahead of them. So we do not have much to learn from them, except perhaps in the manufacture of the rigid airship, the Zeppelin. I know we are behind on that, and that is a very important item.

Mr. HULL. You speak of the dirigible airship. I suppose, of course, if we established such a department as is proposed, it would be understood that they were to take over the control of the lighter-than-air machine the same as the other; that would be the idea?

Gen. MENOHER. Yes.

Mr. HULL. Have you read the different bills now pending before Congress on this subject?

Gen. MENOHER. I have not read the last New bill; I am not familiar with it. There have been some changes. I have not had time to go into it exhaustively.

Mr. HULL. You have read the bill I introduced?

Gen. MENOHER. Yes.

Mr. HULL. You understand the difference between that and Senator New's bill?

Gen. MENOHER. Yes. I just handed Mr. Fisher a copy of the bill that we got up.

Mr. HULL. The idea contained in that bill is along the same lines as the provisions in my bill?

Gen. MENOHER. To a great extent.

Mr. HULL. The phraseology is a little different, and you go a little further along one line than I do. I am not criticizing that. But there is one feature that would have to come out, I am satisfied, and that is the feature by which you depend upon the President for more than I do.

Gen. MENOHER. We are not absolutely committed to that.

Mr. HULL. But it is in the bill.

Gen. MENOHER. I know it is.

Mr. HULL. And I believe the Secretary of War objected to even as much as I had provided for the President to do, and you have asked him to do a great deal more. So that feature, I am sure, would have to go out. But I think those are mere matters of detail. Do you anticipate, if such a bill as yours was passed, that there would be any trouble between the Army and the Navy and the Post Office Department, so far as the matter of coordination is concerned?

Gen. MENOHER. Under which bill, your bill?

Mr. HULL. Yes, or a bill such as yours.

Gen. MENOHER. I feel that there is no danger of it just now. I know from the way the Joint Army and Navy Board is working now that we are going to iron out nearly all the differences that have ex-

isted. I mentioned two of them, in the matter of primary training and the matter of planes for training purposes.

Mr. HULL. Of course, the bill you sent to me and my own simply contemplate the coordinating and the bringing together of these three departments and makes legal the present Aircraft Board, and giving it really quite a good deal more authority.

Gen. MENOHER. It would be differently constituted.

Mr. HULL. Specifically, it would carry them further along. This board would unquestionably have full authority for the making of all rules and regulations in reference to the air. You have that in your bill and I have that in my bill.

Gen. MENOHER. This board would never have the authority to say what type of plane the Army should have and what type of plane the Navy should have. That is to be left to the Army and the Navy. That is fundamental, I think.

Mr. HULL. If the Army wanted a certain type of plane it would go to the board and say, "We want 100 of these planes." Of course, it would be up to the board then to produce those planes. The Army would not be the producing bureau or department.

Gen. MENOHER. Not at all.

Mr. HULL. That is the theory of both your bill and my bill?

Gen. MENOHER. Exactly.

Mr. HULL. And the same way with the Navy. There would be coordination. Of course, the Army might have a plant of its own and run it. But it would have no difficulty, as I anticipate it, nor would the Navy have any difficulty in operating a plant for their work, either through this board or separately. I do not see why it could not be worked out that way. The main thing is to get a board that would have the authority to start out and demonstrate that it could do something. As the Aircraft Board is constituted at present they can not legally make rules and regulations about the air, can they?

Gen. MENOHER. No.

Mr. HULL. They have not got the authority?

Gen. MENOHER. None whatever.

Mr. HULL. That is one of the most important things, is it not, right now?

Gen. MENOHER. I consider it so now, and that is one of the first things I did when I came into the Air Service, but I have never been able to accomplish anything along that line. That matter is bound up with the peace treaty and the league of nations.

Mr. HULL. Supposing we created a separate board or department as Senator New provides in his bill, or as the Curry bill provides, how would the Army get along, do you suppose, in its field operations with such a department operating really separate from the Army?

Gen. MENOHER. I can see nothing but lack of coordination.

Mr. HULL. How about the expense?

Gen. MENOHER. As I said before, I think there would be no increase in expense, so far as the cost and number of planes is concerned, and all that pertains to that, but there would be an increase in the overhead in that you would be creating a whole lot of bureaus in connection with this new force.

Mr. HULL. That is, under Senator News' bill?

Gen. MENOHER. Yes; under the provisions of Senator New's bill. We have the machinery now in the Army and the Navy sufficient to carry on those activities without increasing the number of men.

Mr. HULL. You have studied the foreign systems, have you not?

Gen. MENOHER. Yes; that is the British and the French particularly.

Mr. HULL. Have either the French or the British an air service organized along the lines of a separate service such as is contemplated in Senator New's bill and Mr. Curry's bill?

Gen. MENOHER. The British come pretty near that, but the French do not. The French have a coordinating minister, and he is called such. He reports to the minister of war, but the personnel is still left with the army.

Mr. HULL. What about the British?

Gen. MENOHER. The British service is more nearly independent. It is practically as independent as that called for by the New bill, as I understand it.

Mr. HULL. How is that working?

Gen. MENOHER. I was told the other day—this is only gossip, I suppose—that it was liable to go under unless our separate Air Service came through. I look at it in this way, that if it needs us to keep it alive it had better be abandoned.

Mr. HULL. In what way would ours have any effect on that?

Gen. MENOHER. It is a well-known fact that the British sent a mission over here—at least a mission came over here—to preach the doctrine of a separate air service. That was the inception of it in this country, and it has all been an outgrowth of that, and the separate air service of the British was organized with the express purpose of enabling the British people to be informed that the British were bombing the Germans in retaliation for the raids the Germans were making over England. That was more or less political.

Mr. LAGUARDIA. After all, General, most of the complaints we hear about the British service come from the British Navy. They still have not recovered from the loss of their service. The army aviation being so much larger, it naturally absorbed the navy end of it.

Gen. MENOHER. I know the British Navy people are——

Mr. LAGUARDIA (interposing). Most unhappy.

Gen. MENOHER. They are unhappy over it, and they are against a separate air service.

There is one other thing I would like to say, Mr. Chairman, and that is that we feel as though the officers in the Air Service who are not in favor of a separate Air Service have hardly been given a fair representation, that those who have been called before the subcommittee are representative of the sentiment in favor of a separate Air Service, and that the other side has not been given a fair representation.

Mr. LAGUARDIA. Who would there be of prominence to be heard on the other side?

Gen. MENOHER. I can not name them all right off. But I might mention Col. Gillmore, Col. Kilner, and Col. Andrews. There are a number of officers of prominence who have not been heard and we feel they should be given an opportunity to state their views on this subject.

(Thereupon the subcommittee adjourned.)

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Saturday, December 20, 1919.

The committee met at 2.30 o'clock p. m., Hon. Fiorello H. LaGuardia presiding.

STATEMENT OF BRIG. GEN. WILLIAM MITCHELL, DIRECTOR OF MILITARY AERONAUTICS.

Mr. LAGUARDIA. Gen. Mitchell, the chairman of the Committee on Military Affairs of the House of Representatives is in receipt of a letter dated December 17, 1919, signed by the Secretary of the Navy. This letter has been referred to me by the acting chairman of the committee. In this letter the Secretary of the Navy calls attention to your testimony, or rather the inclosure in the letter refers to your testimony of October and takes exception to your statement contained on page 909 of the hearings. Now, I quote from the letter of the Secretary of the Navy to the Secretary of War, wherein he quotes your testimony as follows:

> The flying personnel of naval aviation are really in favor of it (meaning a separate air service), but hesitate to express their opinions because they are all junior officers and because the senior officers are against it, largely, I believe, from lack of familiarity with the subject.

Have you any comment to make on that testimony?

Gen. MITCHELL. No, sir.

Mr. LAGUARDIA. You stand by it?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. On page 911 of the hearing you testify as follows:

> One thing we have not done is to develop any lighter-than-air machines; that is, rigid dirigibles. I think that is very important, and we have attempted very strenuously lately, with the help of the War Department, to get the L-72, which is in Germany, and which is the last word in dirigibles. Col. Chandler just showed me a cablegram from Paris stating that he could not get that ship on account of the distribution of German aircraft agreed to by the Allies.

You stand by that statement?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. Have you any further statement to make?

Gen. MITCHELL. I would like to make a statement to the committee in general on my evidence before Congress, if I may.

Mr. LAGUARDIA. Will you be brief, please?

Gen. MITCHELL. The statement is this: We are called upon by Congress to give our opinion on what we believe to be the best elements to incorporate in our policy of national defense. I have always given my opinion for what it is worth in accordance with the experience which we have had in aviation before and during the World War; that is, exactly as I see things. In giving the opinion which is brought into question, I gave it after consulting with various officers in the naval flying service, whose names I would rather not give, and after a vote had been taken among a certain number of flying officers, which I believe clearly indicated the ideas of the majority on the subject.

I want it definitely understood that, in so far as the Army is concerned, no attempt from above has ever been made to influence our

testimony; nor has there ever been any disposition along that line in relation to any testimony which we have given. Our relations, in so far as aviation is concerned, with the other branches of the Army, with the General Staff and the Secretary of War, and with officers who are not flying officers are most cordial. We believe that methods should be adopted for a definite policy of national defense and we believe most thoroughly in a united air service, and that is what the nonflying officers in the Navy object to.

Mr. LaGuardia. By the Navy, what do you mean?

Gen. Mitchell. The Navy Department. The statements which I made, that are referred to in the letter, I am able to substantiate all the way through. I can give figures on anything you wish in that respect. We have advocated the unification of Government activities in aviation to bring out a definite air policy for this country in operations, administration, construction, and uniformity in training. It is the only sensible answer to the United States' future in aeronautics.

Mr. LaGuardia. I will state for the record that I invited the Secretary of the Navy to appear before this subcommittee this afternoon to make such statement as he might desire, as we were anxious to close the hearings. I told him he had made an incorrect statement in the statement he made to the press. But the Secretary of the Navy is not present.

Mr. Fuller. It is your impression, General, that the aviators in the Navy are as unanimously in favor of a united Air Service as the Air Service men in the Army?

Gen. Mitchell. I believe that the great majority of flying officers in the Navy are. Unless an officer is a flying officer, he really knows very little about aviation in a practical way. He has never been exposed to any of its dangers; nor can he appreciate the things necessary to develop a successful aviation. It must be understood that our aviation in the Gevernment service is really composed of temporary officers. The temporary officers are the ones that really form the bulk of those who would handle our aviation in war. In the Army, we have only 148 regular officers in the aviation service, of whom 140 are flying officers. We have only had 167 officers qualify as pilots in the Army since the beginning of it. A similar condition exists in the Navy. Only the officers with the most initiative and personal ability take it up, due to its dangers, novelty, and the very adverse conditions under which they have had to contend. The other 1,200 are temporary officers. In the Navy there are about 345 naval aviators, of which about 38 are regulars and 95 student officers. The point I make is that the majority of flying officers all the way through are in favor of a united air service. Of course, there are a few exceptions. That is the result of votes which have been taken among them, which can be shown.

Mr. LaGuardia. Have you any idea about how the percentage would run among the votes?

Gen. Mitchell. Among the temporary officers?

Mr. LaGuardia. Yes.

Gen. Mitchell. I should say over 90 per cent.

Mr. LaGuardia. In favor of a united air service?

Gen. MITCHELL. Yes, sir. The vote of over 1,000 officers showed some 98 per cent, but that included Army and Navy aviators, those who has served in the Army or naval services.

Mr. FISHER. General, the inference we draw from your testimony, taken in its entirety, is that no improvement can be made in the Air Service except by having a separate executive department with a cabinet officer at the head of it, and all the overhead that goes with that; is that correct?

Gen. MITCHELL. I do believe you should start out with a separate department of the Government which should not at first carry a secretary as a member of the cabinet, until the organization of it has been perfected. The overhead that would go with it would be very much less than the overhead that exists now, and the corps of officers assigned to it would be flying officers and would know something about aeronautics first hand instead of those who are not flying officers and have to be told about flying by a second party.

Mr. FISHER. Can you conceive of a separate air service that would improve the present air service of both the Army and the Navy which would, in so far as production and development along technical lines are concerned, be a united air service, but in so far as control of aviators and personnel is concerned that would be left to the Army and the Navy?

Gen. MITCHELL. I believe myself it would be a mistake to do that, because the corps of officers you would have in that case would not have the same morale or incentive to development along aeronautical lines; nor would they proceed on the theory that they are aviation officers first and other officers second. I think it is extremely important to create a corps of air officers who will consider aeronautics as a career, a life work, just the same as officers do in the Army or Navy. If you do not make it that way, you will make aeronautics simply an auxiliary service, and you will not get the development possible where it is considered as a main arm such as other governments consider it. In so far as the technical development is concerned, it is extremely important that we have a central force, because if we do not have a central force to do that work, we will not have a permanent development of material and equipment which the flying officers themselves want. For instance, you have the Army under the War Department; the War Department itself being a civil institution, and the Army under it is a military institution. Without the Army, the War Department would have nothing tangible to hold it together constantly through all changes of administration and over long stretches of time. To develop homogeneity of policy, you need homogeneity of personnel. If you wish to allow a certain part of aviation to remain in the Army, for instance, its observation, and then you allow a part to remain in the Navy, I think it would not work as well as having a homogeneous force, assigned to wherever the greatest amount of usefulness can be accomplished.

Mr. FISHER. It has been suggested along that line by Army officers who have testified before the committee that if you put all of the Air Service into a united air service the problems which are peculiar to the Army and problems which are peculiar to the Navy will not get that same development that they would have if they were left in the separate departments; that the problems are so distinct that they

would be neglected from the point of view of the development of the Army and the development of the Navy.

Gen. MITCHELL. I believe that is not the case.

Mr. FISHER. That seems to be one of the strongest points brought out by those who are opposed to a united service.

Gen. MITCHELL. That is not the case, first, because the aviation that pertains strictly to the Army or Navy is only for observation purposes and constitutes only a twentieth part of the whole, and, next, because if we had that work under the air officers instead of officers of the Army and Navy not familiar with flying they would see to it personally that the efficiency in the Air Service was kept up; they would be interested as a career in the special employment of air units primarily, and they would see that it should be efficient and make good, because they would have to build it up themselves. There is more enthusiasm and more idea of development among flying officers the world over than among any other service. They would see to it that there were sufficient machines, whether with the Army or with the Navy; they would insure at all times that the personnel with the units was properly trained for air work essentially. This bugbear which has been raised about control over personnel that might be assigned to the Air Service is entirely beside the issue, in my opinion. Every law so far suggested contains the provision that the air units, when assigned to the Army or Navy, pass completely under their jurisdiction tactically. To carry out this idea would mean that the marines could not have acted with the Second Division at Chateau-Thierry or the Navy in transporting our troops to Europe.

Mr. HULL. I want to ask you one question. You contemplate in your scheme an absolutely separate service. You would have to have a staff, would you not?

Gen. MITCHELL. In what respect?

Mr. HULL. You would have to have a staff the same as the Navy or the Army has to-day, to take charge of the personnel. There would have to be a staff in the Air Service.

Gen. MITCHELL. No, sir. You would have one staff in the Air Service, the men on which would devote themselves solely to work in connection with that one particular service?

Mr. HULL. That would mean, would it not, a considerable increase in the amount of the overhead expense?

Gen. MITCHELL. It would mean a decrease, because, at present, you have several cumbersome administrative machines. There would be one central technical and administrative department for the Air Service. The only personnel necessary in the Army or Navy would be the operating staffs that pertained to the specific units assigned. This is necessary no matter where these units are. The Navy would draw all of its aeronautical personnel and material from the central reservoir, so that, if the Navy were called upon to engage in a campaign, an order could be issued from a central office, and the entire air force, if necessary, could be diverted to its use. The overhead expense would be cut down from 30 to 40 per cent at least.

Mr. HULL. There would have to be a staff to attend to that part of the work; the Navy would not control it until it was diverted by the Air Service staff.

Gen. MITCHELL. The President would control in that case.

Mr. HULL. The President is too busy a man to go into the details of personnel.

Gen. MITCHELL. That is what he does now, so far as the Army and the Navy are concerned, and that is the only positive control we have, except that exerted by Congress. Congress is really the instrument of coordination.

Mr. HULL. With an Army staff and a Navy staff, there is a tremendous overhead in there; there is no question about that. If you contemplate a similar overhead for both, there certainly would be an increase in the overhead.

Gen. MITCHELL. A united service would cut out all overhead for the Army, Navy, and any other departments and substitute in its place only one organization. We have twice as much overhead right now, in so far as number is concerned, in the Army and Navy alone. When aviation of other departments grows you will have a corresponding increase. We could greatly decrease the number and expense of such overhead and give a complete uniformity of training for air units so that they could all act together according to one system, which is impossible under any other arrangement.

Mr. LAGUARDIA. Gen. Menoher has a staff?

Gen. MITCHELL. Yes, sir.

Mr. LAGUARDIA. And Capt. Craven has a considerable staff here to-day?

Gen. MITCHELL. Yes, sir

Mr. CALDWELL. Before making the statement mentioned in the letter of the Secretary of the Navy, which he has criticised, you had personally talked with a number of air men in the Navy?

Gen MITCHELL. Yes, sir.

Mr. CALDWELL. Were they flyers?

Gen. MITCHELL. They were flyers.

Mr. CALDWELL. How many did you talk to?

Gen. MITCHELL. I talked to a good many; I could not say just how many. It has extended over a long period of time.

Mr. CALDWELL. That does not mean very much to the legal mind.

Gen. MITCHELL. Twenty or thirty.

Mr. CALDWELL. How many flying men are there in the Navy?

Gen. MITCHELL. I gave the figures on that at the present time a while ago, I believe.

Mr. CALDWELL. I did not catch that.

Gen. MITCHELL. About 345.

Mr. CALDWELL. So that you talked to about 10 per cent of them, and you tell the committee that is what the mind of the Navy would be on that subject; is that the idea?

Gen. MITCHELL. No; that is not the idea.

Mr. CALDWELL. What was the idea; that seems to be about what you said.

Gen. MITCHELL. The idea was that I talked to a certain number, and was shown evidence from many more of them sufficient to make up my mind that they are in favor of a united air service.

Mr. CALDWELL. The statement which was taken from the record shows that you say that you believe the flying personnel of the Navy are in favor of a separate air service?

Gen. MITCHELL. That is correct; my own opinion is to that effect.

Mr. CALDWELL. You tell me you only talked to about 30 of the naval officers, and you say you are able to tell a congressional committee investigating this subject that you can tell the mind of 345 men by talking with about 10 per cent of that number?

Gen. MITCHELL. I mean that in my opinion the officers I talked to and those who voted decidedly show the feeling of the flying personnel of the Naval Aviation Service to be in favor of a united service at that time——

Mr. CALDWELL (interposing). And you want to give this committee the idea that all of these 345 men have the same opinion which you gathered from talking to 10 per cent of those men?

Gen. MITCHELL. The idea which I wish to convey is that in my opinion, from the investigation I have made, that is the case.

Mr. OLNEY. In that whole number, it is probable that there was a dissenting voice.

Gen. MITCHELL. There were some who dissented in some particulars, and some entirely.

Mr. OLNEY. It was impossible for you to get the views of each one of the nearly 400 individuals?

Gen. MITCHELL. That is the case. The regular naval flying officers constitute a very small part of the whole number.

Mr. FISHER. Another question which has been raised is whether there would be a complete following out of the orders or commands of those in high command, on the part of the Air Service, and has that been so in previous instances?

Gen. MITCHELL. I have never seen it questioned by those that knew the actual workings of the service.

Mr. FISHER. There was complete and instant compliance with the orders issued by the high command of the Army?

Gen. MITCHELL. There was most perfect cooperation on the front, absolutely so betwen the high command and the Air Service in every particular.

Mr. FISHER. There was never any lack of coordination or cooperation?

Gen. MITCHELL. None on the part of the Air Service. Many ground units, and, at first, air units, were uninstructed in their duties, but this is an unavoidable accompaniment of improvised armies.

Mr. FISHER. How about the English air service?

Gen. MITCHELL. The English air service worked very well along that line.

Mr. FISHER. You were in close touch with their separate air service?

Gen. MITCHELL. I saw a good deal of it, but not as much as I would like to, because after they adopted their separate air service we were engaged in our own operations on our own front. But from what I could find in talking with officers who had seen it in operation and who knew about it, their efficiency was very much increased, because they did not have dual control in the air service, and having it under a single control very much increased the air service efficiency with the army.

Mr. FISHER. There has been just a little attempt to rather insinuate that the aviators, while they did as splendid work as any other branch of the Army, that they were a little bit determined to carry

out their ideas of how the thing ought to be run without consulting with the other branches of the Army.

Gen. MITCHELL. That was not the case as far as the American forces on the front were concerned. The great trouble has been and still is to some extent that officers with no air training are placed virtually in command of air forces for which they are in no way suited. As a matter of principle, no officer can or should be allowed to directly handle aeronautical units unless he is a flying officer, and this is the one point from which more inefficiency and more disorganization results than any one thing.

STATEMENT OF CAPT. THOMAS T. CRAVEN, DIRECTOR OF NAVAL AVIATION.

Mr. LAGUARDIA. Captain, will you please state your rank in Navy and the position you occupy?

Capt. CRAVEN. Captain, United States Navy; Director of Naval Aviation.

Mr. LAGUARDIA. The committee will be glad to hear any statement you desire to make.

Capt. CRAVEN. On what subject?

Mr. LAGUARDIA. I do not know. You asked to testify before the committee. Secretary Danields told me to-day you would come down here to represent him in reference to the matter of a separate air service. That is the only subject before the committee.

Capt. CRAVEN. I think we are here, Mr. Chairman, as naval officers to represent the Navy side of this question and to be sure that the attitude of the Navy is made clear to this committee.

Mr. LAGUARDIA. Allow me to interrupt you a moment there. I simply want to state that Admiral Coontz and Admiral Taylor have testified before this committee.

Capt. CRAVEN. We object to the committee learning the naval opinion only from the Army. We think we should have a voice in the matter, too. A united air service is something which concerns not only the Army but also the Navy, as well as other departments of the Government. It seemed only right and fair to the Navy that if this committee wished to find out the views of the Navy that they should come to the Navy for those views.

I am here ready, Mr. LaGuardia, to answer any questions which you may see fit to ask, if I can answer them, with regard to the opinion of the Navy in connection with this matter.

Mr. LAGUARDIA. Admiral Coontz is a part of the Navy?

Capt. CRAVEN. Yes, sir.

Mr. LAGUARDIA. He is the senior officer in Washington, is he not?

Capt. CRAVEN. Yes, sir.

Mr. LAGUARDIA. Admiral Taylor is next in rank?

Capt. CRAVEN. Not next in rank, but Admiral Taylor is a senior officer of the Navy.

Mr. LAGUARDIA. For that reason we asked them to come before the committee to present the views of the Navy. Commander Maxfield has a good record as an officer and a flyer?

Capt. CRAVEN. Very good.

Mr. LAGUARDIA. And also Commander Child?

Capt. CRAVEN. Very good.

Mr. LaGuardia. Are you in a position to state, Captain, that the majority of the flyers who were in the Navy and who have seen service as flyers are not urging a separate air service?

Capt. Craven. I would like to ask what you mean by flyers in the Navy, reserve officers or regular naval aviators?

Mr. LaGuardia. I am taking in all men who flew in the Navy, whether reserve officers or regular officers.

Capt. Craven. Will you let me ask you a question?

Mr. LaGuardia. I am not the witness.

Capt. Craven. I will submit to the committee that the new and young officers who have come into the Navy recently as aviators can not be considered as naval officers; they have not the experience and they have not the knowledge of naval affairs to qualify them as naval officers, except in that they are simply flyers who have been attached to the Navy for a short period of time. As far as the Navy itself is concerned, they are not competent, in my opinion, to express a view as to the requirements of the Navy, of which they know but little.

Mr. LaGuardia. You would concede that they are in favor of a separate air service?

Capt. Craven. Most assuredly they are, and I believe so are other people and for various reasons, although I am not competent to speak with regard to the views of Army flyers.

Mr. LaGuardia. Let us have the benefit of your experience and your views as to why you believe a united air service would not be for the best interests of the Navy.

Capt. Craven. I would like to say first, with regard to the question which has been raised as to the opinion of the Navy in connection with a united air service, that we have not, in consultations with regard to this matter, particularly concerned ourselves with the views of the young reservists, because we have felt that though they are a splendid class of young men they have not been competent to pass upon general naval matters. We recognize that the young naval reservist aviator now has a very good job, he gets very good pay, and he sometimes may be anxious to keep his present job. We recognize that he is very much interested in his work; we recognize that in many cases he is not particularly interested in going on with his education and qualifying himself to do other work in connection with regular duties in the Navy, and perhaps in the Army that is also true.

So in our investigation of the matter we have concerned ourselves particularly with the officers of the Regular Navy who are not junior officers, who have been interested in naval aviation for some years. We find very few of those officers—I have before me the names of only five—who are in favor of a separate air service, because they feel that under the existing arrangement naval aviation has not pushed along as fast as it should or might.

The great majority of the aviators with whom I have consulted—and I have letters from some who are in remote parts of the world, and many others, I have heard from about 35 of the 50-odd altogether in the service, are absolutely, without reservation, opposed to any such plan. Three or four are in favor of a compromise. That is the situation with regard to the Regular Naval aviators, men who have had experience and who know what we are required to do

with airships and who know what we would be required to do in the airship service in connection with naval vessels.

Mr. CALDWELL. What I understand you to mean by men of that character are men who have had real naval experience and who understand battleships and the service conditions of the Navy.

Capt. CRAVEN. Men of the kind you see around us here. I mean graduates of the Naval Academy, with a naval education. During this war, I think, the situation in so far as aviation was concerned was very much misunderstood. The aviation activities of the Army, particularly, were much greater than the aviation activities of the Navy. They were greater in every way, and naturally the Army ideas predominated. Army aviation predominated in England, and after a while its influence became sufficient so that the administration controlling the aviation of the Army opened up and swallowed the administration of naval aviation. It is always satisfactory for the big fish to swallow the smaller fish; that is, it is satisfactory to the big fish.

To-day you can go to England and you will find the consensus of opinion in the air service in favor of a united force, because the majority of the people in the air service were of the land service. The naval opinion is the opinion of the minority. But I can say advisedly that the naval service in England has not now the success which it seeks in the united air service. They have to-day fleet airplane carriers with the fleet, a large percentage of the crew of which belong to another service. That sort of thing can not make for efficiency.

Mr. CALDWELL. Do I understand by that that the ships that go to sea and carry air service equipment are entirely in the air service, so the Navy has no jurisdiction over them?

Capt. CRAVEN. They are commanded by the regular naval officers, and part of the complement that maneuvers the ship are regular Navy men. The part that handles the equipment of the ship, the offensive power of the ship, are of a different service.

Another thing, during this war naval aviation was not developed until during the latter stages. Our naval aviation abroad was very little heard of. Our work was principally antisubmarine work. We helped to take the Army over, and we helped to cover the lanes through which they approached the places at which they were going to land; we covered zones up and down the coasts. We did not do anything spectacular perhaps in aviation. Before the final stages the British fleet had very few opportunities. We know that during the battle of Jutland a seaplane sighted the advance vessels of the German fleet, but, as a matter of fact, naval aviation of Great Britain did not come to the front until toward the close of the war and never had an opportunity to develop its power in connection with the fleet.

But we are looking to-day for something beyond what was developed during the war. We want a service which we can take with our ships and make the best practical use of all the time. Unless we have the service with us all the time and that service is a part of our family at all times, unless it is developed under our instruction and the subordinates in the service are entirely subordinate in every way, and not subordinate to the Navy as a whole, we will not accomplish what we all desire. We do feel that if you do not have it under the

commander-in-chief, who is responsible, and has been held responsible for every detail of the development and training of that service with the fleet, you are building up a great and expensive theoretical organization which will be without any solid foundation and will fall apart when the critical time comes.

We have examples of that kind to-day. You know that during the present war we took the Coast Guard Service into the Navy. It is an excellent service itself, and did valiant work, and I can not speak of it in any way except in praise, but for some time after it came into the Navy the Coast Guard was more or less handicapped because of lack of indoctrination in naval methods. That lack of indoctrination must enter into our considerations very seriously.

So far I have spoken only of the military aspects of the United Air Service; that is, using the term military in a naval sense. I can see no reason for it at all, and I can support my contention by opinions from many sources.

Take the statements of Gen. Pershing and Gen. Haig and Gen. Wood; take the opinion of any leader who has controlled a combined operation and see if he wishes a separate air service or independent air service.

Mr. CALDWELL. Can you read into the record some of the statements made by men like Foch and Haig?

Mr. FULLER. And also the question that was put up to them.

Capt. CRAVEN. I can not do that. I know from Gen. Haig's final report what his opinion is. If I may read a part of it you will see. He says:

> It should never be forgotten, however, that weapons of this character are incapable of effective independent action. They do not in themselves possess the power to obtain a decision, their real function being to assist the Infantry to get to grips with their opponents. To place in them a reliance out of proportion to their real utility; to imagine, for example, that tanks and airplanes can take the place of infantry and artillery, would be to do a disserve to those who have the future of these new weapons most at heart by robbing them of the power to use them to their best effect.
>
> Every mechanical device so far produced is dependent for its most effective use upon the closest possible association with other arms, and in particular with infantry and artillery. Airplanes must rely upon infantry to prevent the enemy from overrunning their airdromes, and, despite their increasing range and versatility of action, are clearly incapable in themselves of bringing about a decision. Tanks require the closest artillery support to enable them to reach their objectives without falling victims to the enemy's artillery, and are dependent upon the infantry to hold the position they have won.
>
> As an instance of the interdependence of artillery and tanks, we may take the actions fought east of Amiens on Aug. 8, 1918, and following days. A very large number of tanks were employed in these operations, and they carried out their tasks in the most brilliant manner. Yet a scrutiny of the artillery ammunition returns for this period discloses the fact that in no action of similar dimensions had the expenditure of ammunition been so great.
>
> Immense as the influence of mechanical devices may be, they can not decide a campaign. Their true rôle is that of assisting the infantryman, which they have done in a most admirable manner. They can not replace him. Only by the rifle and bayonet of the infantryman can the decisive victory be won.

Admiral Beatty was interviewed in July——

Mr. LAGUARDIA (interposing). Just a moment there. You do not contend that there is anything in the statement you have just read that puts Sir Douglas Haig on record as opposing a separate or united air service, do you?

Capt. CRAVEN. Well; it depends on how you look at it.

Mr. LaGuardia. Exactly.

Capt. Craven. I think so.

Mr. LaGuardia. I want to tell you for your information that we have a statement from Sir Douglas Haig in which he comes out expressly for it.

Capt. Craven. I am rather surprised; I would like to see it.

Mr. LaGuardia. It is in the record. I will ask you this question. What you stated as to the statement of Sir Douglas Haig being opposed to this general scheme is based upon what you have just read to this committee?

Capt. Craven. I have read his entire report, and I took it from that that he was opposed.

Mr. LaGuardia. Did he specifically state that he was against a united air service?

Capt. Craven. That is my impression.

Mr. LaGuardia. That is your conclusion from his report?

Capt. Craven. That is my conclusion from his report, yes.

Mr. LaGuardia. What would you say if he came out expressly, in words, saying that he was in favor of a united air service?

Capt. Craven. I would be obliged to change my opinion.

Mr. Fuller. Is he not referring to a separate air service rather than a united air service?

Mr. LaGuardia. I think he is referring to other combat arms.

Capt. Craven. I think you have Gen. Pershing's evidence on your record, and it is not necessary for me to say anything in regard to that.

Mr. Caldwell. I think we had his testimony to that effect.

Capt. Craven. It is my belief that Gen. Wood has the same idea.

Mr. Caldwell. Will you read into the record what he said.

Capt. Craven. Maj. Gen. Wood, speaking before the Senate Committee on Military Affairs on September 10, 1919, said: "Control of the Pacific is largely a naval problem and there was no reason for increasing overseas garrisons."

The Navy is well aware of this fact, and realizing its importance, feels the necessity of giving special training to its aviation personnel in work strictly along naval lines in order that the division of avation has become an integral part of the Navy, may, in the event of an emergency, be fully qualified to operate in perfect conjunction with the fleets.

Mr. LaGuardia. For your information I will state that Gen. Wood made the following statement to the Senate committee on September 10, approving a separate air service, which appears in the printed record of the hearing before the Senate committee of that date:

A thoroughly organized air service is absolutely essential. War in the air now stands alongside war on the sea and war on land. The force must be trained to cooperate fully or in part with the Army or with the Navy. Under some conditions it will be largely engaged with work with the Army, and again much of it may be needed with the Navy.

It should be under one head. I believe the Government could well take up the question of developing an Air Service both from the military and civil standpoint; for I think we shall have more and more use of aircraft in peace, for the transportation of mails, etc. The most economical way to handle the service would be to have it under one head, attached to one of the present departments of the Government, and have assigned to it for special work officers of the Army and Navy and selected civilians.

The Department of Commerce would seem to be the most appropriate department to attach it to. This service should be charged with the development of flying and everything pertaining thereto. The officers of the Army and Navy attached would naturally give special attention to the requirements of their own services. This department should carry on experimental and development work in connection with possible commercial needs and war needs. It should be the center of development work. It should keep in touch with air work throughout the world. It might well train the flyers for both commercial and war work. In other words, it should be a great central experimental and development plant for aviation for all purposes.

Officers of the Army and Navy would very properly from time to time be sent there for special work. In time of war it would develop into a great training center for Army and Navy officers, and its principal work would always be in following up aviation and in keeping abreast with the best equipment and best methods.

I do not believe that it is necessary to have a special Cabinet officer at the head of this service. I feel that both Army and Navy should have their own aviation arms and that each should be familiar with the other's work as far as possible, so that in case of war we could throw the bulk of our aviation with the Army or with the Navy, as the case may be.

Mr. CALDWELL. Let us have the other statement, too.

Mr. LAGUARDIA. Certainly.

Capt. CRAVEN. I do not want to go on record as saying anything which is incorrect or in any sense as misleading. I see these quotation marks on my paper do not go as far as I thought, so I will not continue to read it.

I will read a report from an officer who has recently been abroad as aviator.

Mr. LAGUARDIA. Before you come to that, would you give us what Marshal Foch said? We have what Gen. Haig said.

Capt. CRAVEN. I have not anything from Marshal Foch.

Mr. LAGUARDIA. You referred to him.

Capt. CRAVEN. I did not mention Foch; I have not heard from him at all.

Mr. LAGUARDIA. You mentioned Sir Douglas Haig and Foch as being opposed to it, in answer to a question of Mr. Caldwell's, I think, as to whether you had these statements, and I think you said yes.

Capt. CRAVEN. I beg your pardon; I think some one else said that. I have not anything from Marshal Foch.

Mr. CALDWELL. It is only fair to Capt. Craven to have in the record exactly what Gen. Wood did say. He said to the Senate Committee:

Officers of the Army and Navy would, very properly, from time to time be sent there for special work. In time of war it would develop into a great training center for Army and Navy flyers. But its principal work would always be in following up aviation and in keeping abreast with the best equipment and best methods.

I do not believe that it is necessary to have a special Cabinet officer at the head of this service. I feel that both Army and Navy should have their own aviation arms, and that each should be familiar with the other's work as far as possible, so that in case of war we could throw the bulk of our aviation with the Army or with the Navy, as the case may be.

I do not believe that we should detail permanently in the Air Service the highly technically trained Regular officers of the Army. They are needed in the command of troops or in special work for which they have been trained,

going on clearly to set out exactly the position taken by the Secretary on this proposition.

Mr. LAGUARDIA. If you want to draw that conclusion from it, you may.

Capt. CRAVEN. I will read to the Committee this report of a conversation with Admiral Beatty:

Admiral Beatty stated that he had supported the creation of the Royal Air Force, for the reason that at the time it was the only way he could get the personnel and material he needed in the grand fleet; he thought that a young and new service would be keen to make a reputation with the two older services (Navy and Army) by being particular to not let anything interfere with Naval and Army aviation needs. In that way, with production centralized, they would get by the troubles they were having for supply of material. But that was his idea during the war; now that the war is over, he does not consider the Royal Air Force organization a proper one, as far as it applies to the Navy and Army; the phrase "Navy and Army and Air" is an attractive one, but it isn't sound in the military sense; in war, aviation should be a corollary in each profession—Navy and Army—and there should be no independent fighting force in the air.

In a separate air force there is not a sufficient guaranty for the future for young men when they consider what will become of them when they have passed the age for flying; the proportion of administrative billets in the air force is too small.

As far as the Navy is concerned, flying is only a small part of naval aviation work, for there is so much more that the officers on aviation duty must know. Officers of the Navy who want to go in for aviation duty could take it up in the same way as officers specialize in gunnery and torpedoes—after finishing a cruise as watch keepers they elect to take up one of the specialties. The officer aboard ship for aviation duty must be a naval officer; the spotter in an aeroplane is just as much a part of the ship's organization (fire-control system) as the officer that rings the bell for salvo fire.

He considered that the value of the independent air force for England was somewhat overrated; results of the war showed that damage by bombing, both physical and moral, was not as great as expected; for example, in spite of the tons and tons of high explosives dropped on Bruges there was surprisingly little damage. The moral effect of the bombing wears off, for the population gradually becomes accustomed to it. Referring to the organization requirements of the United States, he said that with our geographical position there was no excuse at all for an independent fighting air force. But he does believe that a separate air organization is desirable, both for England and any other country, to control all aviation outside of the Navy and Army and to control the aviation production for all, including Navy and Army.

I would like to include in the hearing a statement in connection with this matter made by Capt. Irwin, who was my predecessor as Director of Aviation, and also a statement by Capt. Steele, who was also a flyer, and in command of the aviation detachment of the Atlantic Fleet.

(The statements referred to are as follows:)

A SEPARATE DEPARTMENT OF AERONAUTICS—UNDESIRABLE FROM A NAVAL POINT OF VIEW.

[NOTE.—The following comment was prepared after reading the hearings of Brig. Gen. Mitchell, Col. Chandler, and Maj. Foulois, on Oct. 7, 1919, before the subcommittee of the Committee on Military Affairs, United States Senate, Sixty-sixth Congress, as printed in Senate Document, Part 15, pp. 899 to 939.—N. E. IRWIN, U. S. S. *Oklahoma*, Dec. 1, 1919.]

1. Many of the statements of facts and primary principles are correct but some are distorted, or not presented in their true light and the conclusions reached, opinions expressed, and recommendations made are, to a large extent, erroneous, apparently due to inability to consider the question impartially from a broad point of view, a jealousy of the achievements of other branches of the military (naval) service, and a conviction that all the opponents of their (the above officers) views are prejudiced against them. The best answer to many of their statements is to be found in their own arguments.

2. It is undoubtedly true that (*a*) the use of aircraft is a comparatively new science, (*b*) it was greatly developed during the World War, (*c*) further rapid development may be expected if its investigation and uses are pushed, (*d*) it is at present an expensive enterprise, (*e*) many proper facilities are lacking, and (*f*) in view of the foregoing, its development should have the support of the Government, in the immediate future, for military (including naval) purposes if this Government hopes to be in a position to make use of all of its remarkable resources to defend the country against its enemies (from without or within) in case of emergency. So far as development for civil (including commercial and sporting) purposes is concerned it is believed that the popular demand for aircraft at home and abroad will result in the supply by commercial companies and State authorities of the facilities demanded, including hangars, landing fields, etc., just as the popular use of the automobile has resulted in its enormous production, the establishment of public garages, and the improvement of highways suitable for the use of the automobile.

3. The best organization for the administration of aeronautic affairs in order to bring about the desired development and operation outlined above is a matter of opinion, to a certain extent, so far as the details are concerned, but it can never be accomplished satisfactorily by placing both civil and military under one department, which is to be, confessedly, a third military department of the Government, unless this Government is to become primarily a military one. The Government to-day is essentially a democratic one, and the civil aeronautic interests would never be satisfied to have such development entirely controlled by a military department any more than other civil interests are content with such control.

4. The development of civil aeronautics will be a great asset to the military branches of the Government in time of emergency just as the development of the merchant marine, railroads, automobile, and other industries are an asset, but I doubt if it is of such magnitude as to require, or make desirable, the establishment of a new department of the Government. It seems to me that it could better be a bureau under one of the present civil departments, just as the merchant marine is.

The question of national licenses which has been advanced as one of the reasons for a separate department can best be handled by States just the same as for automobiles, which pass from one State to another, and to foreign countries. In fact, even if a Federal license is established I believe that State authorities will still require State licenses for privately-owned machines just as the States authorities still enforce their quarantine laws and extradition proceedings. In view of the enormous number of private machines of the future, a Federal licensing department would be cumbersome and expensive, and the licensing authority for private machines would seem to be delegated to State authorities. The question of "rules of the road" can easily be handled by a bureau of one of the present civil departments with the assistance of the War and Navy Departments, as is now done for the merchant marine.

Furthermore, even if a separate department is established it will not obviate the jealousies mentioned in these hearings as there must still be formed in such a department the production, testing, personnel, operating, and other divisions between which jealousy is just as likely to occur. The only elimination of such jealousy is by having heads of divisions and other personnel who will subordinate self-aggrandizement to the best interests of all concerned. And still further, the Post Office Department, Agriculture Department, Bureau of Forestry, etc., will desire under their own control all aircraft useful in accomplishing their missions.

5. The question still remains as to whether it is desirable to establish at the present time a separate military department to have control of all military (and naval) aviation. In view of the rapid development in aeronautics, gas engines, and electricity in recent years it is impossible to foresee now what may be accomplished. The time will never come when aircraft unsupported can defeat both armies and navies, but if such a time did come military aviation should well become the major branch of the War Department of the Government and the Army and Navy become subordinate or auxiliary, and in such case a third military department is not needed. The peculiar thing about aviation is that aircraft must "return to earth" (or water), and consequently need a large number of supply, repair, and defense units on a more stable element than the air. This means land and water defenses and supports, and the existing personnel skilled in the military and naval sciences by experience and tradition are better able to perform these duties than a new department,

which would duplicate, in this matter, work now being performed by the Army and Navy.

6. I am not in a position to properly comment on the organization and requirements of the Army, but with the three stated uses of military aircraft at present, i. e., reconnaissance, bombing, and fighting (principally incidental to gaining control of the air for the first two purposes), it seems to me that the Army recognizes the needs for, and will establish, properly equipped reconnaissance and bombing squadrons, the latter to be used similarly to artillery fire, and, instead of the jealousy intimated, will foster the development of this branch of the service to the fullest extent to which it can be efficiently used.

7. From 32 years' naval experience and over 2 years as Director of Naval Aviation, during the war, responsible for the general organization, development, and operation of naval aviation (and qualifying as a naval aviator), I do know that the Navy should have under its own control as much aviation as will increase the efficiency of operation of the fleet and its auxiliaries, including craft for patrol of waters off the coast, and landing expeditions when required. The principal use with the fleet will be reconnaissance, torpedo firing, and fire control, with incidental fighting in connection with gaining mastery of the air, and bombing when the character of the operation permits or requires. Any of these operations on the high seas will require mobile bases, which can undoubtedly be handled better by the Navy than by an independent force not indoctrinated in naval strategy. Even when bombing operations are undertaken by the Navy against outlying or isolated points the same holds true.

8. Civil aviation is no more closely allied to military aviation than ordinary cross-country walking and automobiling is to Army maneuvers, or to naval aviation than the ordinary handling of merchant vessels is to naval strategy and maneuvers. The mere handling of aircraft is one of the smallest duties of the military aviators. The civil aviator is merely a chauffeur for his machine, while the military (or naval) aviator should be so educated and indoctrinated in the strategy and operations of his branch of the service that he can recognize, estimate, and report upon intelligently visible and prospective movements and intentions of the enemy and in order that he can cope with his adversary on equal terms in the future. The above is recognized and admitted by such men as Commodore Charlton, R. A. F., as shown by his statement before the General Board of the Navy. Of course any training that a man has had in civil aviation should be a benefit to him in military work just the same as a reservist should be able to acquire military duties quicker than a man who has had no training whatever, but a civil aviator will not be qualified to perform duty at the front (Army or Navy) efficiently in the future without previous military (naval) training. In fact, Army and Navy aviation are no more closely allied than Army and Navy target practice, fire control, or maneuvers. The underlying principles are the same but the detailed technical knowledge that must be acquired to assure success is totally different. This fact is admitted in England under the United Air Service where after a promiscuous assignment of aviators they are now, after further experience, reverting to the plan of assigning aviators having previous naval knowledge and experience to work with the Navy and those having previous Army knowledge and experience to work with the Army, which practically requires two corps of aviators under the one united air department. In view of the above fact the National Aeronautical Academy which it is proposed to establish, must, in order to turn out proficient Army and Navy aviators, in addition to teaching them the theory of flight, a knowledge of their machines and the art of flying, establish a special course of training for the Army and one for the Navy, both of which would be more or less a duplication of work at West Point and Annapolis, and require an enormous additional useless expense to the Government in the construction and overhead changes for maintenance of such an academy. A better system, so far as the Navy is concerned, is to take graduates of the Naval Academy who have had two years experience at sea, and send them to a flight-training station for aviation training, and later, as many of them as may be necessary for a postgraduate course in aeronautics as is now done in ordnance, marine engines, electricity, and naval construction.

9. In any profession the man best qualified to judge of the tools, instruments, or equipment best suited to his needs is the man who has studied the object to be accomplished and has sufficient experience to make him realize the practical difficulties to be overcome in its accomplishment, although he may call on technical designers to assist him to develop and manufacture such equipment. Admitting then that experienced aviators are the best judge of the actual

flying qualities of aircraft, still it requires the man who has the sea habit and is indoctrinated in the naval strategy to decide upon the military characteristics of aircraft for the most efficient service with the fleet. In other words a civil aviator is no more qualified to decide upon the military characteristics of aircraft for fleet work than a merchant marine officer is to decide the characteristics of battleships, destroyers, or submarines. The converse of the above is also true, viz: That, as aircraft is now admittedly of great assistance in fire control of the fleet, gunnery officers of the future who have previously had actual experience as naval aviators will be in a much better position to appreciate the capabilities of aircraft and the benefits to be gained by their use, but with a separate aviation corps, a gunnery officer (or captain of a naval vessel) will never have the opportunity of increasing his usefulness to the Navy by having had such experience. If the Navy sticks to the problem of developing naval aircraft and the Army to developing aircraft for use with the Army there will be no duplication of effort any more than in the development of naval and Army ordnance, fire-control methods, or other equipment used by both, and where the duties of the two services overlap, or require similar equipment, each service should and has consulted the knowledge of the sister service, notwithstanding statements to the contrary. If there have been petty jealousies between the Army and Navy in the past, as there are with certain types of men in any walk of life, there will certainly be additional jealousy with a third independent military department, and the only way to eliminate it is to eliminate such personnel from positions where it will effect the service.

10. Referring to the statement in the hearings relative to mixed uniform, if the above lines of organization and development are followed naval aviators will be naval officers and Army aviators will be Army officers, and there will be no question of mixed uniforms, as each officer should wear the uniform of the service to which he belongs, with such additional flying clothing as is necessary when actually on flight duty. The present naval aviation forestry green uniform was adopted in time of war for use at shore stations which were being established upon advice of the naval authorities of the Allies for operations against submarines. The color (which is the same as for the Marine Corps, a branch of the Navy) was chosen as being more suitable for work on shore than blue or white and was afterwards authorized for naval training stations, etc., on shore. If abandoned for other shore duty it should be abandoned for naval aviation.

11. The foregoing is written as applying to both heavier and lighter than air services, but in reality they are very dissimilar in material, design, construction, care, handling, operation, and lifting force, as one glides on the air by its propulsive power and the other floats in the air by its buoyancy. Having been two years as Director of Naval Aviation during the war and intereted in the development and performance of both types of aircraft so far as they would assist the Navy in accomplishing its mission, I consider myself in a better position to discuss this phase of the subject impartially than a man who has spent even 11 years in the aviation service and devoted his time to heavier-than-air craft only. If it is necessary to have a separate department of the Government for aviation, then there should be two such departments, because with only one it must have separate bureaus or divisions for each, and the jealousies stated as existing in such cases would be detrimental to both. To accompany the fleet on the high seas the Navy certainly needs large airships of long endurance on account of the difficulties of refueling at sea under all conditions of weather. I do not at present see the same reason for large airships to cooperate with land operations, unless it be over a large stretch of territory where it is impossible to land. Certainly the handling and navigation of a large airship in all kinds of weather is more closely allied to the work of a sailor than that of a soldier and was so recognized in England, where the construction and operation of airships was placed under the control of the Admiralty, the air service merely supplying the funds to provide the material to meet the demands of the Admiralty. However, if the Army needs either small or large airships to increase the efficiency of its operations it should be permitted to develop and operate such as will best meet its requirements, the same as developing its ordnance, artillery, or other necessary equipment and corps.

12. Referring to the statement of Gen. Mitchell on page 909 of the hearings as to the discontinuance of the Aviation Division of the Navy, the statement as presented to the committee is misleading. The Navy Department has never

had an aviation or aeronautic bureau or division as established in the Army and as referred to generally in the hearings. General Order No. 41 of June 23, 1913, as modified by General Order No. 222 of June 20, 1916, and General Order No. 469 of May 5, 1919, assigns the cognizance of aviation material to the various material bureaus having cognizance of similar material in the general plan of organization of the Navy Department, and the personnel is handled by the bureau having charge of personnel in general. It is the duty of the Office of Operations to coordinate the work of the various bureaus in supplying material, determine the character of flight training of aviators, and plan for and operate the aircraft in accordance with plans previously approved by the department. At the beginning of the war, when aviation was practically in its infancy and rapid expansion was anticipated, the office of the Director of Naval Aviation was established and handled all questions in the Office of Operations pertaining to aviation, but such an arrangement was only intended to last until aviation was upon a production basis. The interoffice order quoted on page 909 merely reassigns the duties in connection with aviation in the Office of Operations so that all matters pertaining to naval aircraft and aviation are handled in the same manner as destroyers, submarines, or other activities, just as it should be, in accordance with the entire general organization of the Navy Department.

13. Referring to the statement of Gen. Foulois on page 950 of the hearings relative to the lack of teamwork of all elements in a military machine, and allegations on succeeding pages relative to the supply of material for naval aviation, and its operation abroad, these statements are incomplete and consequently his deductions misleading and inaccurate. At the time this country entered the present war the submarine menace was at its height, and the first mission of the Navy was to devise and execute methods to decrease this menace and make the high seas safe for the transportation to Europe of troops and supplies for the Allies as well as for ourselves. Due to the great demand for equipment by all branches of the Governments it was discovered by early fall of 1917 (or sooner) that priority must be given raw material and transportation of supplies, according to its intended use. The representatives of the Allies and Admiral Sims recommended that priority should be given to all material to be used in connection with operations against submarines. This matter was taken up with the War Department, and, so far as aircraft material was concerned, with the aircraft board. The aircraft board concurred in the recommendation and the War Department and the Navy Department approved. In addition to checking the submarines in the Atlantic Ocean, naval authorities agreed that they should be attacked in their bases. At first it was the intention to use seaplanes to assist in this work, and for this purpose bases were established at Dunkirk and the east coast of England. Later advices stated that this was impracticable on account of the character of German aircraft defending their submarine bases, and early in 1918 it was recommended that land bombing machine be used supported by fighting machines. In March, 1918, the matter was laid before the War Department, which department concurred with the Navy Department that as the undertaking was against a naval objective it was purely a naval one. The War Department agreed to supply certain machines and suggested that other machines be obtained abroad. Further details of the expedition were carried out in accordance with this agreement.

Referring to the statements (p. 953) relative to the allocation of Liberty engines to the Navy, Gen, Foulois again fails to state the situation in its correct light. In the fall of 1917 the Navy Department made an estimate of the number of Liberty engines that would be required during 1918 to equip the seaplanes it was expected would be built. In order to avoid any duplication of effort or confusion of contracts all orders for these engines were placed through the War Department with the understanding that the Navy was to have priority of delivery on the number of engines required to equip machines that could be turned out for use against submarines. In the spring of 1918, due to the requests of the Allies for engines and the delivery of both seaplanes and engines being behind schedule, a revised estimate was made and 734 was given as the least number that would equip the Navy planes that would be completed by July 1, 1918. This number was much smaller than the original number and was, therefore, merely an underdelivery on Navy contract of engines to be installed in seaplanes for use against submarines and in keeping open the lines of communication from America to Europe in order that the troops at the front could be kept supplied with food and ammunition for use against the Hun, in

accordance with the policy adopted upon the best information and advices received from abroad. It needs, therefore, no defense from adverse criticism.

14. The voluminous statements of Maj. Foulois on pages 960 to 972, while being plausible and insidious, are not convincing. In fact many of the statements can be used as an argument on the opposite side of the question. Attention is invited to the following:

Page 960, paragraph 4: "Approximately 90 per cent of all air-service work is performed on the ground, etc." This indicates that 90 per cent of the training of a naval aviator should be to fit him for this line of work, which means train him as a naval officer first and a post-graduate course in aviation and aeronautics later.

Page 960, paragraph 4: "* * *. The longer he efficiently serves the greater becomes his executive and administrative responsibilities on the ground," etc. * * *." If naval aviators are in regular line for promotion as naval officers this experience will benefit the naval service in higher ranks. (See previous comment on this subject.)

Page 961, paragraph 2: "* * *. The reverse of this is also true, that a brigadier general of the Army who has not had actual air-service experience can not be as efficient in his general services, etc." Apply this to the Navy future flag officers will be in a better position for their general administrative duties for having had actual experience in the air service that will be used hereafter in operations of the fleet, and the efficiency of the Navy should not be curtailed by having such air service performed by a separate department.

Page 965, paragraph 1: "The numerous uses to which the seaplane can be applied in strictly Government service will probably never be developed under existing state of affairs. * * *" There is no reason why it should not be developed as the use of automobiles, motor transport, and other service has been developed and will continue to be developed.

Page 966, paragraph 1: "* * *. To-day the Navy aviation is carrying on experiments with land types of aeroplanes, etc. * * *." The Navy is experimenting with land types principally for use in flying off of ships' decks, and aviators who have had previous naval service are much better fitted for this work than those who have not had such experience. Wherever land types are under consideration the Army has in the past and should in the future be consulted relative to general flying and landing qualities but not as to suitability for naval use.

Page 967, last paragraph: "The technical experts and all the practical air experience in the Army and Navy should be placed at the disposal of the Post Office Department, etc." Quite right—not to interfere with naval efficiency. The Navy now has at the navy yard, League Island, a seaplane factory, where the Navy Department will undoubtedly be glad to undertake development or construction work of aircraft for any other department of the Government just as it now undertakes the repair or construction at navy yards of surface craft for the War Department, Coast Guard, Lighthouse Service, and Shipping Board. The formation of a new third department, either civil or military, would not make this any better for the Post Office Department, but would be an enormous unjustifiable additional expense to the Government at a time when the greatest economy is required to meet the present economical situation and is desired by the people in general.

Page 972, paragraphs 4, 5, 6, and 7: " * * * On the one side you have the majority of the greatest foreign civil, military, naval and air leaders in the war, etc. * * * On the other side you have probably two departments of the Government which are opposed, etc. * * *." In order to be accurate these assertions should be changed to read: " * * * On the one side you have some of the foreign civil, military, naval and air leaders, etc. * * * On the other side you have equally great leaders, broader minds, and deeper thinkers in the War and Navy Departments who believe it to be unnecessary, undesirable, uneconomical, and inefficient to establish a separate military aeronautical department, and in addition, many civil department officials who have the same point of view relative to the establishment of a separate civil department of the Government.

15. The foregoing can be summed up as follows:

(*a*) It is unnecessary and undesirable to establish a separate civil department of the Government to develop civil aviation.

(*b*) Even if such a department were established other civil departments would want to acquire and control such aircraft as are useful for the work of the several departments.

(*c*) The popular demand for civil aircraft (commercial or sporting) will be the incentive for its development just as has been the case for the railroads, telegraph, automobiles, etc.

(*d*) The few duties (such as establishment of "Rules of the road" to be assigned to such a proposed Federal department can be best performed by a bureau of one of the present civil Federal departments assisted by the War and Navy Departments.

(*e*) Some of the duties stated as belonging to such a department will be performed by State authorities.

(*f*) The establishment of a separate military department of aviation is undesirable and not justifiable from a military (naval) point of view.

(*g*) Such a third military department would tend to increase rather than lessen any interdepartmental jealousy.

(*h*) Civil aeronautics would never be satisfied to have all civil aviation controlled by a military department.

(*i*) The establishment of a national aeronautic academy would be a large unjustifiable expense.

(*j*) The major portion of the instruction at such an academy would be a duplication of that given at West Point and Annapolis.

(*k*) A better method for naval aviators is to take naval officers with two years experience at sea and assign them for fight training and postgraduate course in aeronautics.

(*l*) The requirements for a proficient military aviator are far in excess of those of a civil aviator, and duties of a naval aviator differ from those of an Army aviator.

(*m*) The best naval aviator is one indoctrined in the strategy of the fleet. This is true for deciding upon characteristics of aircraft for the fleet as well as duty with the fleet.

(*n*) Actual experience as a naval aviator will be of benefit to future gunnery officers, commanding officers, and flag officers.

(*o*) A separate aviation corps is not desirable for the Navy.

(*p*) The Navy should control the development and operation of so much aviation as will insure the efficiency of operation of the fleet and its auxiliaries.

(*q*) There will be no unnecessary duplication of effort if the Navy develops aircraft for naval use and the Army develops aircraft for use with the Army, each taking advantage of the knowledge and experience of the other.

(*r*) Lighter-than-air craft differs from heavier-than-air craft in material, design, construction, care, and operation.

(*s*) If the reasons given for establishing a separate air department are accepted, then there should be two separate air departments.

(*t*) The Navy will need large airships to accompany the fleet on the high seas.

(*u*) The operation of large airships is more colsely allied to the work of a sailor than to that of a soldier.

(*v*) The Navy has already shown an interest in the development of its air service.

(*w*) The Navy Department administration of matters relating to naval aircraft is (and should continue to be) on the same lines as matters relating to surface craft and submarines.

(*x*) The Navy now has at one of the navy yards facilities for constructing seaplanes, which is available to construct aircraft for other branches of the Government, if desired.

(*y*) From its experience in the construction of surface craft, the Navy is in a better position to-day than any other branch of the Government to construct and develop large airships which it will need for work with the fleet.

(*z*) The removal of naval aviation from the control of the Navy will be detrimental to naval aviation and detrimental to the naval service. Therefore, whatever is done with aviation in other branches of the Government, nothing should be done that would interfere with the future efficiency of the Navy, a service that has proven its value in the past.

STATEMENT OF CAPT. G. W. STEELE, JR., UNITED STATES NAVY.

Reports are current that a movement is afoot to bring about legislation to combine all the branches of Government aviation under one head. The exact plan of the originators is not known; there are rumors that the plan is to create a department of aviation, with a Cabinet officer at its head, and again the plan is reported to involve placing the production only under a single directing head

and continuing the operation as at present, under the Departments of War, Navy, Post Office, etc. Under either of these plans, or any other plan which takes naval aviation out of entire control of the Navy Department, this branch of the service is going to suffer, and any attempt at such legislation should be opposed, and, if possible, defeated.

The mission of naval aviation is to operate in conjunction with the fleet. This requires aircraft suitable for such operations and personnel familiar with fleet methods and procedure.

The issue of production was befogged during the war by naval aviation getting involved in projects not properly coming within its sphere, notably, the northern bombing group project. At the time this matter was considered there appeared sufficient reasons for the Navy Department's undertaking it, and these reasons were concurred in by the War Department. But in retrospect the whole project seems to have been of a military and not a naval nature. Nevertheless, the Navy called upon the Army for a number of airplanes of the military type, and, while this number was comparatively very small, this demand furnished the sponsors of a combined production scheme sufficient justification in stating that such an example will occur again. Further to befog this issue, not with this intention, perhaps, the Army has called on the Navy to be furnished with flying boats for some of its aviation stations on the coast. But the fact that both services use the same types of aircraft does not argue for a combined producing agency.

There are at present on hand, left over from war production, a large number of airplanes of all types, both naval and military. It is unnecessary at present to create an agency for rapidly producing an additional number. What should be done now is to slow down production and begin experimenting with new designs. These new designs must come from experience in operation, and the way to profit by the experience of the operators is to become acquainted with them, and live and work with them. Very little progress could be made dealing formally with strangers. The Army finds by experience that it needs certain modifications in present types, or wholly new types, and the Navy similarly finds itself progressing, and these ideas are worked out within those services. Where are these plans to be executed? In the Navy, at the Naval Aircraft factory, probably, and in the Army at an equivalent plant. This is not quantity production, and quantity production is not urgent at present. When it becomes so it will be time enough to determine the question of priority and allotment. For many years the Navy has used the Army rifle, and continued to use it during the war. It accepted the rifle as it was, because a rfle is a rifle intended for acertain purpose, and rightly the Navy assumed that the Army knew best the purpose and the way to build the rifle to attain it. Nobody has arisen to urge a united production for rifles.

Now, if the Army were unable or indisposed to furnish the Navy with sufficient rifles, the Navy would probably go to some outside manufacturer for them, but it would not attempt to design a rifle; it would accept the Army rifle, in all probability, and order that type from some manufacturer who could produce it. If the Army or the Navy find themselves in need of aircraft of the type developed by the other, they may order them in the same way the Navy obtains Army rifles, but the development of types should be left to the separate services. In the event of combining aircraft production under one head what would become of the Naval Aircraft Factory, a huge plant located in the Philadelphia Navy Yard and so surrounded by other yard activities that it would be impossible to separate it from naval control?

Taking up the question of a combined air force under a Cabinet officer, the difficulties to be encountered appear even greater than those of material production alone. Let us suppose that the legislation has been enacted and the Secretary of Aviation appointed. The first step will be to provide personnel for the new department. Where are they to come from? Undoubtedly a number of Army aviators would enter the new branch, and, possibly, a few Navy aviators. The list will then be scanned to provide the demand for aviators for the Navy, and, naturally, the men who came from the Navy will be detailed for naval duty.

But, supposing the Navy had only enough aviators for its needs before naval aviation was abolished, and as many men from that branch did not go into the new service, the shortage will have to be made up. How will this be done? Probably by detailing former Army aviators to duty with land machines; this means on battleships and airplane carriers, and these men are totally strange to Navy customs and procedure and shipboard life.

They will learn, of course, but naval aviators have already learned. When it comes time to relieve these air force aviators the process of breaking in will have to be repeated, and this breaking in will continue forever, unless we do what the British did, make military and naval aviation two separate branches under the air ministry.

To whom will aviators detailed from the air force to the Navy be responsible? By what regulations will they be governed? If they live on board ship they will have to obey the regulations of the ship, which are the regulations of the Navy, but they will also be amenable to the regulations of the air force. Who will pay them, and how will they receive their payments? To whom will they make reports; to the air force, or the Navy, or both?

Who is going to teach them navigation and seamanship? They will have to possess a knowledge of both these subjects in order to succeed. When the officers and men of the air force are finally billetted on board ship, operations commence. They do not know the first thing about naval procedure, gunnery, communications, characteristics of ships, types, and many other little things which the naval man knows by instinct. Who is going to teach the new man all these things? When the officer wishes a leave of absence, to whom will he apply? When wronged, to whom shall he go for redress? When deserving of punishment, who shall punish him? When dead, who shall bury him?

Besides the officers it requires a large number of men, machinists, carpenters, fabric men, wire workers, riggers, radio operators, gunners, photographers, etc., for the operation and upkeep of aircraft. These men will presumably be taken over into the new air force, and then comes the same problem of getting them back on board ship in a new status.

All of the above has been intended as destructive criticism; now for the constructive: Make naval aviation an integral part of the Navy by having aviation duties performed by regular naval officers of the line and staff. Let all services using aircraft experiment and develop them to suit their separate needs. If one service develops a type which suits the other, so much the better.

I have a great many telegrams and letters with regard to the feeling abroad concerning this combined service. As I have said, in so far as the Navy is concerned, I feel that I am correct in stating that the British Navy is opposed to the combined service.

Mr. LaGuardia. You would not say that the separate air service in England is not progressing, developing, and functioning satisfactorily?

Capt. Craven. I will read you a telegram from a very reliable source, handed to me by an Army officer of high rank. This is from a reliable source in London.

Mr. LaGuardia. Naval?

Capt. Craven. I do not like to state for the record who it is from. It says:

That the various criticisms which have been leveled at the Air Ministry recently are not in themselves sufficiently serious or fundamental to overthrow it is the consensus of the best and most reliable opinion on the air crisis. Everyone agrees, however, that the present Air Ministry is indefensible and illogical in theory, but that it will probably continue as it now is for a considerable period. The three alternatives which present themselves are: First, a separate Air Service may be done away with, and the Air Service returned to the respective control of the Army and Navy. As this would be a step backward, it is believed that it will not be taken. Second, the Air Ministry may take its place along with the War Office and the Admiralty as a third separate service, having its own representative in the Imperial Cabinet. The objections to this, however, are that the cabinet is already too numerous and too unwieldy, and that the Air Ministry is not now, and probably for a long time will not be, of sufficient importance to warrant this step. This might be changed in a short time by a tremendous boom in civil aviation, which is now practically dead. Third, the most radical solution by far is the much talked of scheme of defense. A great joint Imperial General Staff composed of the Army, Navy, and the Air Force will be at the head of this. In the cabinet,

one member would represent the combined War Office, Admiralty, and the Air Ministry. Prejudices between the three services constitute the principal objections to this course, which are numerous.

Mr. LaGuardia. Can you give the date of that?

Capt. Craven. That was dated in London, December 12.

Mr. LaGuardia. 1918 or 1919?

Capt. Craven. 1919.

Mr. Fuller. Do you cite that as being opposed to a separate service?

Capt. Craven. I cite that as a statement to the effect that the present service in England is not satisfactory. I do not at all think that what is good for England is necessarily good for the United States.

Mr. Fuller. I did not see in that what there was unfavorable to a separate service. I understood that message to say it would be a distinct step backward to put it under the Army or the Navy.

Capt. Craven. I cite that to show that the service as organized in England is unsatisfactory. England is the only country in the world which has that service, the need for which is being discussed in this country now. I also wish to state that in my opinion what is good for England is not necessarily good for us. We have our own problems which we must work out in our own way, and we can not necessarily follow what is done abroad.

Mr. LaGuardia. In connection with that, I have a report from London, and I do not care to disclose its identity. It was made in April, 1919, and it states emphatically that there was no idea of changing the system which is working very satisfactorily in England, and I will put that in the record in connection with yours.

It says:

I am in receipt of your memorandum of April 24 regarding the present organization of the British Air Force and have had a conference to-day with the Director of Air Organization to determine, if possible, definitely the answers to your questions.

As far as organization is concerned, this is still in a state of embryo and the peace establishment will not be ready for some two or three weeks, owing to the absence of Gen. Trenchard, chief of the Air Staff. However, I have been promised that I will get an advance copy by approximately the 10th of May, and will transmit it immediately to you.

The organization table will, I believe, not differ very materially from the one sent you with previous reports except that some departments, which were formerly separate, will be consolidated. The establishment will be smaller, of course. There will be no training until January, 1920, and the peace course is not yet determined.

In my talk I learned that, as far as could be determined, there was no indication at all that the Air Force would go back under the Army and Navy but it would continue as a separate force. The separation, as you probably know, was brought about through the question of supplies as it was found that the Army and Navy conflicted a great deal in their orders and that one or the other of the services suffered unnecessarily. The fact that one Cabinet Minister is both Secretary of State for War and for Air does not mean in any way that the Air Force is going back again under the Army; and in this organization an assistant secretary is under the above named who deals entirely with the Air Force. The Air Force, however, do not consider this a satisfactory arrangement and would much sooner have a separate Air Cabinet Minister altogether as the question of supply and personnel will always conflict to a certain extent, and they feel that a separate minister is able to obtain far more satisfactory results.

The fact that the two services were combined in the cabinet is hard to be accounted for, but it was intimated to me to be a desire for political power and ambition. During the war, when the Air Force was a separate organization, cooperation between the Army and the Air Force was very complete. The Air Force were assigned to the commander in chief, who laid out his plans for any

given operation and the Air Force worked out all the details. The cooperation between the Army and the Air Force at home has also been very complete and this is largely due to the fact that they have had an officer from the Military Operations Department assigned to the Air Ministry who appreciated the Air Force and the nature of its work. Cooperation with the Navy, however, has not been quite as satisfactory and the dealings between the two services are of a much more formal character, due largely to the old conservative traditions of the Admiralty. Liaison in this case is carried on by a former naval officer, now in the Air Force, who has an office in the Admiralty, known as the "Air Division Admiralty."

It was the opinion of the D. A. O. that the Air Service could function satisfactorily separately under both the Army and Navy, provided always that the question of supply was combined and provided that the Air Service got their proper quota of high-grade personnel, and was not made to suffer in this respect because older branches of the Army, such as M. T. O. and Engineers conflicted a good deal in these demands.

I am putting up an official letter to-day confirming my interview and requesting additional information together with any charts and tables that may be available.

Capt. CRAVEN. There are a great many arguments which you have listened to pro and con on this proposition. I will not attempt to reiterate all of them, but I would like to go over some of the salient points.

Mr. LAGUARDIA. We would like to get your views rather than anything else.

Capt. CRAVEN. In the first place, as I have already intimated, in my opinion, unity of command in war is an essential. In military preparations for war those charged with responsibilities for efficiency in the Army and the Navy must have full cognizance of training. The air is not a separate war area, but one common to both the Army and the Navy. The types of machines and numbers in the aviation services which are adjuncts to the Army and the Navy as well as the tactics of the air force must accord with the general military and naval policies. The above are impossible in a United Air Service.

Naval aviation is a part of the fleet, and must exist as an integral part of the fleet. Naval aviators must be of the Navy, have naval training, and be vitally interested in the work of the Navy; otherwise there must be loss of efficiency. It is difficult to see how air stations like those at Hampton Roads and Pensacola—where these form a part of naval stations—can be separate from the Navy.

It is difficult to see how air stations like those at Hampton Roads and Pensacola, where these men are a part of the Regular Naval Establishment, can be separated from the Navy, and it has been proposed in certain bills introduced in Congress that parts of the Navy there now used by aviation should be separated and given to another service. It could only be done at great expense and would involve great duplication.

Mr. FULLER. What bill is that in?

Capt. CRAVEN. That is in Senator New's bill. It takes away those things from the Navy, takes them away from the establishment which is now concerned with naval aviation and gives them to another service.

In time of peace, the production of many military machines is uneconomical for the Government. Experimentation along logical and parallel lines by many is more desirable than by any single bureau or department. Standardization means standing still. Sepa-

rate sources of supply make for competition, securing the best material. A single source of supply does not.

Undesirable duplication will be avoided by a proper coordination of the activities of the Army and the Navy, and other departments of the Government.

Normal life in the Army and the Navy in time of peace is exceedingly artificial. It is stimulated through esprit de corps and by competition. This competition, to some degree, may be unnatural, but it is nevertheless absolutely necessary if stagnation is to be avoided. Healthful competition between the Army and the Navy is desirable, in so far as aviation is concerned. Competition in the air eliminated if a united air service is established.

By keeping aviation a part of the Army and the Navy and by retaining officers of the Army and the Navy in aviation, a mutual familiarity on the part of the Army and the Navy and their respective air services is assured. It can not be through other arrangements.

Officers and men of a separate service can not be fed into the regular ranks of the Army and the Navy when they cease flying, as is the case at present, and these individuals would become pensioners upon the Government at an early age.

There is, to some degree, a natural and covert feeling of jealousy on the part of the line officers of the Army and the Navy against the aviator, and this jealousy is reciprocated to some degree by the aviator. The regular line officer considers that the aviator should not draw extra pay, and that he can fly but not think. The aviator considers that a man of the regular line is not particularly useful because he can not fly. This breach, which can be controlled where aviation is a part of the Army and the Navy would become wide indeed and very troublesome if the Air Service became an entirely separate organization.

What is now desirable is the production and development of experimental types with the view of the advancement of the art. Naturally it is important in any country at this time to build up industrial aviation. It may be that the producer is an advocate of a United Air Service because of the idea that such may force a market for flying equipment.

Officers, for personal reasons, wishing to retain their positions and pay, may also advocate this service, which, if established as outlined in the "New Bill" would impose a terrific burden on the taxpayer by reason of the numbers and ranks proposed for the service and the pay active and retired thereby authorized.

The only good argument which may be made in favor of a united air service is based on the elimination of duplication, in so far as expenditures and materials are concerned. This can be avoided by the determination on the part of the various governmental departments to prevent duplication.

There can be no doubt as to the advisability of having a centralized body of some kind in which all of the various departmental activities of the Government are represented as well as those of civil aviation. This organization should carefully scrutinize all the aviation projects on the part of the different departments of the Government and point out anything which may cause duplica-

tion. Such a body would have cognizance of the licensing of pilots and machines, formulation of the laws for flying, and the fostering of civil aviation. It, in fact, would be the centralized body handling aviation in this country, and having cognizance of aviation in matters of international and interstate concern. The organization of such a body is undoubtedly necessary and should be effected at an early date, but its establishment should be in accordance with the needs of all departments of the Government, as well as of civil aviation, and not in accordance with the desires of but a single element of one department of the Government.

I submit that this whole problem is one which concerns not only the Army and the Navy but every department of the Government, and before we foist something on the Government which we call a United Air Service, we must go deeply into it to see that what we adopt sifts into the old organization and does not mix up the whole thing.

Mr. LaGuardia. Captain, you agree that centralization of some sort is necessary?

Capt. Craven. Centralization of some sort for certain purposes is necessary.

Mr. LaGuardia. There is a great deal of aviation that is equipment and supplies, and that is a great problem.

Capt. Craven. That is a great problem.

Mr. LaGuardia. Do you know any reason why the matter of supplies, maintenance, and repair could not be jointly carried on?

Capt. Craven. I do not think that the supply of naval machines and naval equipment can properly be carried on by anybody except the Navy.

Mr. LaGuardia. Then you assume that no naval officer, or no one familiar with naval types would favor any separate air service?

Capt. Craven. I have not said anything like that. I have said that the majority of the Regular Navy is in favor of a purely naval organization.

Mr. LaGuardia. A great many of the machines used by the naval air force are land machines, are they not?

Capt. Craven. A great many?

Mr. LaGuardia. Yes.

Capt. Craven. We have not succeeded in getting a great many yet; we have some.

Mr. LaGuardia. I mean, so far as the nature of the operations is concerned, you would use land machines?

Capt. Craven. We would use machines of a land type which would be employed for naval purposes.

Mr. LaGuardia. I will exclude from my questions all planes carried on ships or planes used exclusively from ship to ship. That, we all agree, should be under the control of the Navy. Excluding that, let us take bombing, for instance. Is there anything particularly and especially naval about bombing from the air?

Capt. Craven. It depends upon where it originates.

Mr. LaGuardia. It originates from land.

Capt. Craven. Suppose it originates from a ship?

Mr. LaGuardia. In what way?

Capt. CRAVEN. Such as bombing ships and submarines, bombing bases and places of that kind; that might be a naval activity entirely.

Mr. LAGUARDIA. Is there anything different, so far as flying is concerned, between bombing a naval base or a railway station?

Capt. CRAVEN. Possibly not.

Mr. LAGUARDIA. Is there anything different in bombing from the air, whether you bomb a moving train or a moving ship?

Capt. CRAVEN. Yes; I think so.

Mr. LAGUARDIA. That requires particular naval training?

Capt. CRAVEN. Yes; most decidedly, because bombing a ship, if my construction of what the Navy is intended for is correct, means you should bomb a ship anywhere in the world, and that means you have got to have fliers who know how to fly the machines from ships and to operate with ships and who should therefore be sailors.

Mr. LAGUARDIA. I stated that so far as planes carried on ships are concerned, that is conceded to be entirely a naval function. In my questions, if you will remember, I am excluding consideration of that type of plane entirely, but I am taking operations from land.

Capt. CRAVEN. If you are going to discuss land operations, I suggest that you talk to the Army.

Mr. LAGUARDIA. Then you say there is no land operation that is peculiarly applicable to the Navy?

Capt. CRAVEN. Not necessarily; we assist in many land operations.

Mr. LAGUARDIA. But there is nothing in it which requires special naval training?

Capt. CRAVEN. In operations over land?

Mr. LAGUARDIA. Or in some land operations flying over water?

Capt. CRAVEN. Not necessarily.

Mr. LAGUARDIA. So far as the primary training is concerned, could that not be directed on some joint scheme?

Capt. CRAVEN. It is now done jointly, by the Army and the Navy.

Mr. LAGUARDIA. And is functioning satisfactorily?

Capt. CRAVEN. We train our own pilots in seaplane flying and the Army trains its own pilots in land flying. We train some Army pilots in seaplane work and the Army is now training some of our men in flying land machines.

Mr. LAGUARDIA. But there is no reason why the Navy should control any land-flying machines?

Capt. CRAVEN. Oh, yes, there is.

Mr. LAGUARDIA. Will you give us an instance.

Capt. CRAVEN. Those are the types of machines which we fly from turrets.

Mr. LAGUARDIA. Captain, they are different planes entirely.

Capt. CRAVEN. No, we use land planes.

Mr. LAGUARDIA. You are talking about planes which are flown from turrets and from mother ships. I am talking about land planes.

Capt. CRAVEN. I can not answer your question because at the present time we are using the land type of plane for flying from turrets, and we are flying them especially for our own naval uses. But it may be in the time to come we will be able to develop another type of plane which will be something of the seaplane type, and which then may be quite a different type from the Army plane.

Mr. LaGuardia. But the Army is now training these men for you?

Capt. Craven. Certain of them; yes.

Mr. LaGuardia. You made reference to the desire of some men in the Army to receive more pay. From that I take it you desire to go on record to the effect that the naval officers are now receiving sufficient pay?

Capt. Craven. No, most certainly not. I can not understand such an inference. Some of them are nearly starving to death.

Mr. LaGuardia. You do not blame us if we try to give these men a living wage?

Capt. Craven. Not a bit; I am heartily in favor of it.

Mr. LaGuardia. The centralized body you suggest you say could take jurisdiction over the inspection of all planes—that is, civil?

Capt. Craven. Civil planes; yes.

Mr. LaGuardia. And foster civilian aviation?

Capt. Craven. In so far as they could do so under our Government. So far there has been a disinclination on the part of this Government to subsidize or foster civil industries. But there should be some way to help out, if it is practicable to do so.

Mr. LaGuardia. You would approve a system whereby the Government would establish a chain of landing fields and a bureau of information for technical advice, and making rules for flying and giving assistance in the way of the development of civil aviation?

Capt. Craven. Entirely.

Mr. LaGuardia. Could that not be concentrated in one department?

Capt. Craven. I have suggested that.

Mr. LaGuardia. So the only thing, as I understand you, Captain, that you insist upon is that planes that are carried on ships and the personnel that operate these planes from ships should be a part of the Navy?

Capt. Craven. Not only the planes, but everything else which refers to naval aviation should be in that same category, training and development of all kinds—dirigibles, kite ballons, and equipment of that kind should all have the same status.

Mr. LaGuardia. If this committee, after very careful investigation and consideration, came to the conclusion that it was for the best interests of the country to have a separate air service, you would then oppose it?

Capt. Craven. I would have to be shown.

Mr. LaGuardia. But you would be fair about it?

Capt. Craven. I try to be fair in such things.

Mr. LaGuardia. Assuming that we establish a separate air service, we could expect loyal cooperation and support from the Navy, could we not?

Capt. Craven. I think so. The country has gotten the support of the Navy so far, and I do not think it will be withdrawn for any reason. But I think I am prepared to tell you what the Navy opinion is with regard to what it needs.

Mr. LaGuardia. You stated that you have about 50 naval officers who are flyers; is that correct?

Capt. Craven. Yes; that is true.

Mr. LaGuardia. And you said about 35 of those are opposed——

Capt. Craven. About 35 are opposed to an independent air service. I have not heard from them all.

Mr. LaGuardia. These men know the policy of the department, do they not, that the department is opposed to it?

Capt. Craven. Most of them do. But let me say this right here, that I resent any insinuation that these young men would be coerced or biased in expressing their opinion to me by any such thing as that.

Mr. LaGuardia. I am very glad to hear that. I was somewhat concerned about the two gallant officers who testified here. I hope they will not incur the displeasure of the department in any way.

Capt. Craven. No, sir; they will not.

Mr. LaGuardia. Then your criticism of the English service is based on what you have read about the complaints of the British Navy?

Capt. Craven. My associations, of course, have been more with naval officers than with Army officers. I know a great many British naval officers; unhappily, I know very few British Army officers.

Mr. LaGuardia. You admit that it is necessary to have an aviation industry going in this country to meet an emergency, should we be confronted by one?

Capt. Craven. It is very desirable to encourage civil aviation and aviation industries in every way.

Mr. LaGuardia. Do you not think, Captain, that the more flying we can give our men the better aviators they will become?

Capt. Craven. If it is flying which is useful in getting military results, I agree with you. But I submit that unless the flying is useful flying and is used correctly in a naval sense, its value to the Navy is not what it should be, and it may be negligible.

Mr. LaGuardia. If we establish mail lines from the mainland to islands, or over waters, would that not be a very useful occupation of planes?

Capt. Craven. A fine occupation for flyers.

Mr. LaGuardia. Would that not develop good Navy flyers?

Capt. Craven. No; I think not.

Mr. LaGuardia. Why not?

Capt. Craven. Because they would be unfamiliar with Navy methods; they would know nothing of the sea.

Mr. Fuller. So far as the primary or the preliminary stages are concerned, would not that be helpful?

Capt. Craven. What do you mean by preliminary stages?

Mr. Fuller. When the men are just learning to fly.

Capt. Craven. They know how to fly; but unless they know how to use their flying advantageously in connection with naval work, they would be of no particular service to the Navy.

Mr. Fuller. What sort of practical work would a Navy flier have to do to keep himself in trim?

Capt. Craven. We now have planes on battleships with the fleet. Officers handling those planes would be idle a great deal of the time, if they do nothing but fly those planes. If they are regular naval officers they can be given other work on the ship. Officers of a ship spend a good deal of their time familiarizing themselves with all the

activities which go to make up the usefulness of that ship, such as the fire control methods, battery work, and fleet tactics, not only of battleships, but also of the destroyers and the submarines, and other units that go to make up the fleet.

We have in addition to planes aboard ships, a detachment of boats which flies around and accompanies the fleet, and which is mothered by a ship. Those boats are presumed to drill and work out, in connection with the fleet, problems of scouting, and they are also useful for bombing operations, perhaps of ships and perhaps of bases.

At the present time it is true that many of the pilots flying these machines are these young and unqualified officers from the reserves, excellent, splendid material. We hope we will keep many of them with us, but we also hope when they get into the Navy they will qualify along the regular lines of the work of a naval officer.

Mr. LaGuardia. You would not approve of the establishment of a national academy of aeronautics?

Capt. Craven. I see no necessity for it so far as the Navy is concerned.

Mr. Hull. You spoke about commercial aviation. Do you believe that there is much of a future, so far as you can see at the present time, for commercial aviation, and if so, in what way?

Capt. Craven. I am sorry to say that I do not see, so far as the immediate future is concerned, a great field for commercial aviation. I venture to suggest that a future will be produced for it in time, but just now our efforts are somewhat forced. It is useful for the Post Office Department. I think that during this winter in some of the Southern States, particularly on the coasts of Florida and in like regions, a few men, who have started in aviation business, will make money because they did not have to pay much for their machines, and they are working among a class of people who are willing to pay a considerable amount to fly for pleasure.

Mr. Hull. What are they doing?

Capt. Craven. They are taking people up for flights.

Mr. Hull. That is, just sport?

Capt. Craven. That is just sport; yes, sir.

Mr. Hull. That is not naval flying?

Capt. Craven. Not at all.

Mr. Hull. There is at the present time practically no commercial aviation, is there?

Capt. Craven. No, I know of none.

Mr. Hull. As I understand it, the Navy Department at the present time would not object to the establishment of a bureau or a commission which would operate in conjunction with the Army, the Navy, the Post Office Department, and probably the Coast and Geodetic Survey and some other branches of the Government in coordinating aviation activities, so far as research, engineering, and production are concerned and the making of rules and regulation for flying. Beyond that, of course, you find opinion divided. But we are all in favor of the united air service that far, as I understand it. Beyond that there comes the training, where there is a wide difference of opinion as to whether you should train the Navy men and the Army men together. You do not think that is practicable?

Capt. Craven. No, sir; there can be no objection to a bureau or commission such as you suggest.

Mr. HULL. And beyond that, so far as the operations are concerned, you are absolutely opposed to the idea?

Capt. CRAVEN. Yes, sir.

Mr. FULLER. Why can not the men start their primary training together?

Capt. CRAVEN. You mean learning to fly?

Mr. FULLER. Yes.

Capt. CRAVEN. That could be done, if you wish to teach elementary training, but that is just a small part of the education of a naval man.

Mr. FULLER. That is the start, is it not?

Capt. CRAVEN. That is the start of the flying end of it, but a man who can simply fly is of but slight use to the Navy.

Mr. LAGUARDIA. Why could not the Navy officers instruct the pilots in navigation?

Capt. CRAVEN. They try to.

Mr. FULLER. You mean you could not use a man like Richenbacher?

Capt. CRAVEN. Not without a great deal of naval education.

Mr. FULLER. You would not consider men with such qualifications as fit naval officers?

Capt. CRAVEN. They would require a great deal of education before they would become qualified naval officers, which they must be in order to be most useful to us.

Mr. LAGUARDIA. Are all your flyers so qualified?

Capt. CRAVEN. The Navy flyers are; the reserve officers are not. Our course at Pensacola for naval aviators now, that is, for men in the regular service, is about 9 months. Elementary flying takes about 10 hours.

Mr. LAGUARDIA. What do you give them in the course at Pensacola?

Capt. CRAVEN. We give them a very complete course in signaling and radio; we give them an engineering course, instruction in taking care of their engines, and in overhauling them, in navigation, meteorology, and subjects of that nature; we teach them, as a matter of fact, all details in both lighter and heavier than air.

Mr. LAGUARDIA. That is what I had in mind when I asked you about national aeronautics. Why could not one large school take charge of all of that education?

Capt. CRAVEN. It could, but I fail to see the advantage of it. You would not get the Navy atmosphere in such a place. You might have one big college on this subject, but it is better, I think, to have different ones.

Mr. OLNEY. I want to say that, if we had any united air force the operations would be conducted separately and independently by each department; that would not interfere at all with the efficiency of your own operations?

Capt. CRAVEN. I appreciate that very thoroughly, sir; but I submit that the secret of success is in preparation. If you want to carry on an operation successfully, you have to prepare for it, and to prepare for it means that you have got to train for it; and the commander in chief that has charge of the operation has to have cognizance of the training that leads up to the operation if he is going to be held responsible for the result of the operation.

Mr. OLNEY. Yes; but the Aircraft Board is still in existence?

Capt. CRAVEN. We have a board acting between the Army and the Navy, called the "Joint Committee on Aeronautics." There is the National Committee on Aeronautics; there is the Aircraft Technical Board, which is still in existence, though it has had no meetings for some time. There is a joint board on helium between the Army and the Navy.

Mr. LAGUARDIA. There are a good many boards.

Mr. OLNEY. Which ought to be combined.

Capt. CRAVEN. Yes; the plan ought to be simplified, and I think it will. We are endeavoring to simplify it now.

Mr. OLNEY. They are all advisory, and have no compelling authority?

Capt. CRAVEN. They are all advisory. I hope I have not conveyed the impression that I am in favor of a central supply and engineering organization.

Mr. LAGUARDIA. Capt. Craven, we will give you the benefit of every doubt. [Laughter.]

Capt. CRAVEN. Because I am not. I think, in so far as the Navy is concerned, production should be by the Navy, in time of peace.

Mr. FULLER. What do you favor in combining the two services?

Capt. CRAVEN. I fail to see how you can combine anything of the two present services satisfactorily. You do not want a third and independent service, which has been proposed because of the vast overhead entailed. I differ with Gen. Mitchell in regard to this matter. I think there would be great duplication if you had a third service. It would take over certain naval functions, certain military functions, and certain functions of other departments, notably the Post Office Department, the surveying of the forests, the Geodetic Survey, the Fisheries Service. All of those departments are going to resent having a separate department of the Government appear and take over the control of their present functions.

Mr. LAGUARDIA. You are familiar with the history of the American Navy, are you?

Capt. CRAVEN. No; only fairly so.

Mr. LAGUARDIA. You know that there was a great deal of opposition when the Navy was separated from the War Department and the Navy Department established? Did you know that?

Capt. CRAVEN. Yes.

Mr. LAGUARDIA. I suppose you also know that prior to the establishment of the Navy Department they had committees and boards created for the purpose of constructing ships and obtaining personnel?

Capt. CRAVEN. Yes.

Mr. LAGUARDIA. And it was not without a struggle that the Navy Department was established?

Capt. CRAVEN. Yes; I have full knowledge of that. And I think now that if you propose at this time to reorganize military affairs in this Government, you had better go further than the mere creation of a new department.

Mr. LAGUARDIA. What would you suggest?

Capt. CRAVEN. Well, you had better reorganize both the Army and the Navy.

Mr. LAGUARDIA. That is what we are going to do.

Capt. CRAVEN (continuing). And the whole scheme of governmental control, if you propose creating a military business, which we have not in this country.

Mr. LAGUARDIA. Capt. Mustin is a regular Navy officer, is he not?

Capt. CRAVEN. Yes; an excellent one.

Mr. LAGUARDIA. He does not fully agree with you in your views on this matter, does he?

Capt. CRAVEN. Well, along general lines; our general lines of thought are not alike.

Mr. LAGUARDIA. He concurs in the Crowell report, with certain reservations, does he not?

Capt. CRAVEN. Yes; those reservations, however, you will find are quite important; they can not be glossed over.

Mr. LAGUARDIA. We were very anxious to have Capt. Mustin here; but the Secretary of the Navy informs us that if we call Capt. Mustin here, it will interfere with the operations of the Pacific Fleet, and we did not want to interfere with the operations of the Pacific Fleet.

Capt. CRAVEN. His recommendations are all here, and I invite your careful attention to them.

Mr. LAGUARDIA. Yes; we have them. There is a shortage of officers in the Navy now, is there not?

Capt. CRAVEN. Yes.

Mr. LAGUARDIA. Are you not using a great many naval officers here in Washington on the administrative side of aviation who could be assigned to ships?

Capt. CRAVEN. I do not think so. Of course, I am not charged with that responsibility; I can only express an opinion. I do not think so.

Mr. LAGUARDIA. Well, approximately how many naval officers—I mean qualified naval officers, regular officers—are there in Washington to-day assigned to administrative aviation matters?

Capt. CRAVEN. About 14.

Mr. LAGUARDIA. How many officers in a 10,000-ton ship?

Capt. CRAVEN. In a 10,000-ton ship?

Mr. LAGUARDIA. Yes.

Capt. CRAVEN. Forty or fifty.

Mr. LAGUARDIA. It would help some, would it not, to have those officers who are now stationed here on those ships?

Capt. CRAVEN. Yes; perhaps slightly; but whom would you substitute for those officers?

Mr. LAGUARDIA. I would substitute for those officers flying officers specially trained for that.

Capt. CRAVEN. Yes; but if you take out the flyers you have not got anywhere near 14 here. I object to the idea that when it comes to administration a man has to be able to fly.

Mr. LAGUARDIA. Well, the fact that a man is a flyer would not disqualify him, other things being equal, would it?

Capt. CRAVEN. No; it would be a very good thing for him to be able to fly, but he does not have to be able to fly in order to be able to administer.

Mr. LAGUARDIA. Not at this time; but if aviation develops, as some of us think it will, in time to come, as men grow older and have completed their flying, they will be very useful in these posi-

tions; and then the time will come, I believe, when we will have all flying men attending to this work.

Capt. CRAVEN. If they have had the experience and have the knowledge of the things into which aviation has to adjust itself, they will be very useful as administrators; otherwise, not.

Mr. LAGUARDIA. Well, I stated "other things being equal."

Capt. CRAVEN. I want to make it very clear that they have to have the general experience; otherwise they will not get on.

Mr. LAGUARDIA. Take two men of general experience, equally able; the one who has been a flyer would be preferable to the other, would he not?

Capt. CRAVEN. I question that. Of course, there should be flyers of rank and experience at the head or in the leading positions in naval aviation; there is no doubt of that, and that condition will come as time passes. But, obviously, this man must have had general naval experience and have a knowledge of naval subjects in order to be really useful.

Mr. LAGUARDIA. Are there any other questions?

Capt. Hunsaker, I think you came down here to testify?

STATEMENT OF COMMANDER J. C. HUNSAKER, UNITED STATES NAVY.

Commander HUNSAKER. No; but I will be very glad to give you any information that I have.

Mr. LAGUARDIA. Will you give your name and position for the record?

Commander HUNSAKER. J. C. Hunsaker, commander, Construction Corps, United States Navy.

Mr. LAGUARDIA. I will state for the benefit of the committee that Commander Hunsaker is one of the best authorities in the United States on naval aeronautics. You were an instructor at the Massachusetts Institute of Technology, were you not?

Commander HUNSAKER. During one tour of duty I was detailed at the Massachusetts Institute of Technology as an instructor.

Mr. LAGUARDIA. Commander, what are your views on this subject? Do you believe that aviation could be fostered in this country and developed by the creation of a united air force which would have a personnel sufficient to take this subject and make a specialty of it?

Commander HUNSAKER. May I have a little more of the question? I understood you to ask, Do I believe that aviation would be fostered?

Mr. LAGUARDIA. And developed.

Commander HUNSAKER. Do you mean aviation commercially, or aviation from a military and naval standpoint?

Mr. LAGUARDIA. I mean aviation in general first.

Commander HUNSAKER. I believe that such a department, if heavily subsidized by the Government, could stimulate commercial aviation at the expense of naval and military if it were so desired.

Mr. LAGUARDIA. And what would you advise in order to stimulate the military side of aviation—military and naval—in order for this country to keep abreast of other nations and be ready in the event of emergency?

Commander HUNSAKER. Liberal appropriations to the Army and the Navy.

Mr. LAGUARDIA. And you would keep them separate?

Commander HUNSAKER. Yes, sir.

Mr. LAGUARDIA. What are your reasons for that?

Commander HUNSAKER. Because their functions are separate.

Mr. LAGUARDIA. You could design Army planes, could you not?

Commander HUNSAKER. Not to-day.

Mr. LAGUARDIA. You could give very valuable advice on motors and equipment on planes, could you not?

Commander HUNSAKER. I would not consider it such.

Mr. LAGUARDIA. You are very modest. Do you believe, then, that the Navy at present has all the facilities necessary to develop aviation to the utmost?

Commander HUNSAKER. No, sir.

Mr. LAGUARDIA. You do not?

Commander HUNSAKER. It is never satisfied.

Mr. LAGUARDIA. What would you suggest in order to give you ideal conditions—I mean the Navy?

Commander HUNSAKER. More money.

Mr. LAGUARDIA. How much more than we are giving you?

Commander HUNSAKER. I do not know how much we will get next year, but if we get the $47,000,000 asked for I think that is all we can spend wisely and legitimately; no more money is desirable.

Mr. LAGUARDIA. Do you believe it would be a saving if we united these activities and made a generous appropriation rather than giving the Navy all it asked for and giving the Army all it asked for and the Post Office all it asked for and the Department of the Interior and other departments that may come in and want some aviation?

Commander HUNSAKER. Would you give the new department more than the sum total of the appropriations to the separate departments?

Mr. LAGUARDIA. No; we would give it less.

Commander HUNSAKER. If you gave it the same or less, I believe you would have less aviation in the air than if your appropriations were made direct to the departments which already have the administrative machinery to handle their aviation without spending one cent of aviation money to run it. In the Navy Department aviation spends not one cent for the supplies and the accounting for the personnel, for the administration of justice—that is, the Judge Advocate General's office.

Mr. LAGUARDIA. What do you mean when you say it does not spend a cent? It comes from other funds, does it not?

Commander HUNSAKER. We have already a Paymaster General and a Bureau of Supplies and Accounts to buy anything that the Navy wants from beans to aeroplanes.

Mr. LAGUARDIA. Are they buying separately for the Aviation Department?

Commander HUNSAKER. They are; yes, sir.

Mr. LAGUARDIA. So that you are quite satisfied, then, with the naval system?

Commander HUNSAKER. Yes, sir.

Mr. LAGUARDIA. You do not think it can be improved?

Commander HUNSACKER. The Navy is never satisfied. It can be improved inside the Navy.

Mr. LaGuardia. How would you improve it?

Commander Hunsacker. It can not be improved by beginning over again.

Mr. LaGuardia. Do you think that the present system of dividing the supplies among your present bureaus is satisfactory from the aviation standpoint?

Commander Hunsacker. At the present time I believe that is the best method. As aviation develops, I believe that system will be modified to suit. That is the tradition of the Navy: As the Navy grows, conditions are modified inside the service to meet the developments.

Mr. LaGuardia. So, that you do not feel that the Navy requires anything else than you have asked for?

Commander Hunsacker. Let them have the money and a free hand, and they will work out their own salvation.

Mr. LaGuardia. Are they having a free hand now?

Commander Hunsacker. Yes, sir.

Mr. LaGuardia. Are there other questions? That is all, Commander Hunsacker.

What other witness do you desire to have heard, Capt. Craven?

Capt. Craven. I would like to have you talk with some of these flyers in the Navy, if you will.

Mr. LaGuardia. All right. Whom do you desire to call first?

Mr. Craven. I will call Mr. Byrd first.

STATEMENT OF LIEUT. COMMANDER RICHARD E. BYRD, UNITED STATES NAVY.

Mr. LaGuardia. Please state your full name.

Lieut. Commander Byrd. Richard E. Byrd, lieutenant commander, United States Navy.

Mr. LaGuardia. Do you desire to make a statement?

Lieut. Commander Byrd. Yes, sir.

Mr. LaGuardia. You may proceed.

Lieut. Commander Byrd. In regard to the united air service in England, from what I have read in the magazines, and from talking with officers of the air service who were formerly in the navy, I think that England is drifting toward a separation of naval aviation from the air service. I do not think the united service there has been entirely successful. [Reading:]

As soon the the army and naval aviation were amalgamated in England, competition between these two branches was lost and the soldiers wished they were back in the army and the sailors wished they were back in the navy. Sailors were made to do soldiers' work and soldiers were made to do sailors' work, and the organization, which became a mixture of army and naval procedure, caused a loss of morale in the air force. Competition was lost also in the procurement of aeroplanes. Alamgamation left only one department to pass upon new inventions and designs, whereas formerly two departmets, each jealous of the advancement of the other, gave most careful consideration to anything that might allow them to advance beyond their rival.

In broad terms, the arguments in favor of a united air force must necessarily fall into two general classes. First, it is contended that there would be a greater efficiency in the coordination and cooperation of air activities with fighting units of the Army and the Navy:

and, secondly, that such a combination would give a relatively greater efficiency with smaller expenditures. In short, that it would be more economical.

Let us consider the first of these arguments—the effect of an air force on the efficiency of aviation in war time. The primary duty of the Army air force is to operate with mobile land-fighting units, acting as scouts, bombers, fire control units, and to drive off and destroy enemy forces; whereas, the chief duty of the naval flying corps is to patrol for submarines, to assist sea-going units in reconnaissance and control of ships' fire, and the destruction of enemy craft. To properly fulfill its function, Army aviation must be as different from naval aviation as the Army is from the Navy.

Mr. LaGuardia. How many craft were destroyed in the last war by aviation?

Lieut. Commander Byrd. How many submarines, or sea craft?

Mr. LaGuardia. Sea craft.

Lieut. Commander Byrd. I will supply that information later.

(The statement referred to is as follows:)

There are on record 15 instances where submarines were possibly damaged or sunk by United States naval aviators. Our naval aircraft made 5,691 flights, covering a total of 791,398 nautical miles. During the last 10 months of hostilities no convoy protected by our naval aircraft was successfully attacked by the enemy. I know of no case where our aircraft sank any surface craft.

Lieut. Commander Byrd (continuing). An aviator with the fleet must know the sea. He must know the types of ships and aircraft he is operating with and against. He must understand naval strategy and tactics, naval procedure and communication, and fire control. He must be thoroughly familiar with the science of dead reckoning and astronomical navigation. He must have the naval esprit, education, and understanding. In short, he must be a seaman.

The development of our large-type dirigibles and flying boats will necessitate very long-distance scouting and reconnaissance work at sea. Such work by the German Zeppelins more than once saved German fleets from total destruction. An expert knowledge of the sea is required for long-distance reconnaissance, for air navigation of the ocean is even more difficult than surface craft navigation. No one could possibly believe that Commander Towers and his gallant seaplane crew could have directed their course for 250 miles in a stormy sea had they not been seagoing officers.

Mr. LaGuardia. Was Alcock a seagoing officer?

Lieut. Commander Byrd. Alcock was not a seagoing officer, but Lieut. Brown, who accompanied him, was an expert navigator. Commander Grieve and Commander Read were also expert navigators.

The greater weight of a flying boat, as compared with the fuselage and wheels of a land plane, makes even the flying itself of a different nature. An Army flyer would crash if he attempted to land a seaplane in a rough sea; he would fall into the ocean if he should attempt to make the same sort of turns and to climb or glide in the same manner as he does in a land machine. However, the actual manual control of an airplane is a small part of the train-

ing of a naval aviator. The training of a land flier and a sea flier is just as different as is the training given Army officers at West Point and naval officers at Annapolis.

The most important work of aviation in the future will be with the great fleets. Under a separate air force, to whom will aviators detailed to battleships be responsible? What set of regulations will they obey—those of the air force or those of the Navy? Will an infraction of the regulations be punished by the Navy or the air force?

Mr. LaGuardia. If you had read the bill you would have said that they would obey the regulations of the Navy and the order of the naval authorities.

Lieut. Commander Byrd. Then the air force would have to learn Army regulations, naval regulations, and their own regulations; and it seems to me that that is too much to put upon them.

Mr. LaGuardia. The Marine Corps function with the Army, does it not?

Lieut. Commander Byrd. Yes; it has functioned with the Army.

Mr. LaGuardia. And does it also function with the Navy?

Lieut. Commander Byrd. Yes.

Mr. LaGuardia. All right; you may proceed.

Lieut. Commander Byrd. Will the courts-martial of the Navy or those of the air force be utilized? Who will pay air force officers on sea duty? To whom will they make reports? Who will teach them navigation and seamanship? When dead, who will bury them?

Mr. LaGuardia. Is there any difference between the burying of a naval man and the burying of a landman, or any other?

Lieut. Commander Byrd. No; not as regards the actual ceremony.

Mr. LaGuardia. All right; go ahead.

Lieut. Commander Byrd. Should a united air force be formed now, what would an officer in this force know 20 years hence about the fundamentals of naval tactics, strategy, administration, and operation? Naval aviation must exist as an integral part of the fleet. The keynote of success and the avoidance of mistakes lie in preparation and a strongly united effort. The commander's men must be trained for the work in hand. This is an axiomatic truth and supplies a compelling reason for retaining the Marine Corps as an adjunct to the Navy. If the Marine Corps were assigned directly to the Army, it would soon lose all amphibious characteristics.

Mr. LaGuardia. Is that the only reason for the Marine Corps?

Lieut. Commander Byrd. That is a reason.

Mr. LaGuardia. Is there any other reason why we must have a Marine Corps?

Lieut. Commander Byrd. They should fight from the ships as landing parties, whether or not they are trained by the Navy.

Mr. LaGuardia. The Marine Corps is part of the Navy, is it not?

Lieut. Commander Byrd. The Marine Corps is part of the Navy and comes under the Secretary of the Navy.

Mr. LaGuardia. Exactly; it is not a part of the Army?

Lieut. Commander Byrd. No, sir.

Mr. LaGuardia. And do you not know the real purpose of the Marine Corps and its origin?

Lieut. Commander BYRD. I know it was started in England to fight, I think, from the ships; to form landing parties, and to do guard duty, etc.

Mr. LAGUARDIA. You are a regular naval officer, are you not?

Lieut. Commander BYRD. I am.

Mr. LAGUARDIA. Go ahead.

Lieut. Commander BYRD. But the Secretary of the Navy does not have to request the Marine Corps to do something, as would have to be done with a separate air force; he can order the Marine Corps; he does not have to regulate the unit by request.

Mr. LAGUARDIA. Was the origin of the Marine Corps for strategical purposes, or was it for some other reason?

Lieut. Commander BYRD. For strategical and tactical purposes.

Mr. LAGUARDIA. That is your answer, is it?

Lieut. Commander BYRD. Yes.

Mr. LAGUARDIA. All right.

Lieut Commander BYRD. The different parts of a military machine can not be coordinated on the day of a battle unless they have been brought together under one mind during the times of peace. The commander in battle must be the commander in preparation for battle.

The much-worn phrases "the eyes of the Navy" and "the eyes of the Army" express very well the greatest usefulness of aircraft. Can we promote the efficiency of our military services by taking the Army's eyes and the Navy's eyes away from them, and putting them into the head of another being who will use them for the Army and the Navy only upon request?

Mr. LAGUARDIA. I will tell you again that the bill specifically provides that the Army and the Navy shall have their own observation squadrons?

Lieut. Commander BYRD. But they have to request the detail of such squadrons, as I understand the bill.

Mr. LAGUARDIA. They would be assigned. Go ahead.

Lieut Commander BYRD. Just as every man needs eyes under his absolute control to look when and where he desires, so the Army and the Navy each requires its own eyes under its absolute control. A blind man, even when led, is a poor fighter.

A serious drawback to a successful working-out of a united air force would be the friction which would surely result among the personnel. As long as the Allies in Europe were fighting for their very lives, there was little friction between their military bodies. But as soon as the enemy was defeated, serious disagreements arose between the commanders of the Allied Armies. So it is bound to be with the joint air force. One of the simplest and most fundamental of military truths is that a military machine will not run smoothly where it is necessary for the commander in chief to operate certain units by request. This would be the case with aviation under a united air force.

On one occasion during the present war, Gen. Haig had the enemy on the go and in such a position that a follow-up bombing squadron would be of the greatest assistance in his further operations against the Huns. He wired a request to the commander in chief of the air force that he be furnished immediately with a bombing squadron.

Mr. LAGUARDIA. What air force?

Lieut. Commander BYRD. The united air force of England.

Mr. LAGUARDIA. What was the date?

Lieut. Commander BYRD. I have not the date here, but I can supply it.

Mr. LAGUARDIA. What operation was it in?

Lieut. Commander BYRD. I think it was an offensive operation near the Belgium line.

Mr. LAGUARDIA. What was the source of your information?

Lieut. Commander BYRD. I got it from the files of the department. I think I can get you the date.

Mr. LAGUARDIA. That is very interesting; I would like to have it.

(The statement referred to is as follows:)

This incident occurred in the fall of 1917.

Lieut. Commander BYRD. The request of Gen. Haig was not complied with, and he took the matter to one of the other great departments of the Government, who, in turn, requested the air force to supply Gen. Haig with the bombing planes. After four days the planes were sent, but it was then too late to use them for the purpose requested.

Even if certain aviation units from the air force are put entirely under the control of the Army or the Navy, they would be subject to recall at any moment. An air-force officer might be under the naval commander in chief one year; the next he might be serving the commander of the air force, and the third, the commander in chief of the Army. The Bible is quite right in stating that "No man can serve two masters; for either he will hate the one and love the other, or else he will hold to the one and despise the other."

Mr. LAGUARDIA. Is that part of the naval training?

Lieut. Commander BYRD. No.

Mr. LAGUARDIA. But you are not trained to hate the Army, are you?

Lieut. Commander BYRD. No; but we serve only one master.

Mr. LAGUARDIA. Who is that—the Navy or the country?

Lieut. Commander BYRD. The Navy and therefore the country.

Mr. LAGUARDIA. All right; proceed.

Lieut. Commander BYRD. The majority of the officers who would decide the numbers of personnel and the types of seaplanes to be assigned to the Navy would be Army trained aviators, who would know less than a seaman about the problems which confront our great fleet. They would hardly have any practical knowledge of the uses to which these aircraft would be put. The commander in chief of the armies in the field would be compelled to depend upon the secretary of aeronautics and the general director in charge of aeronautics for their air equipment in personnel and material. The commander in chief of the fleet would be dependent upon two chiefs, the secretary of aeronautics and the military director of aeronautics, for the most important unit of his command, and neither of these chiefs would be intimately familiar with his problems.

Now, let us take up the economical aspects of a combined air force. It would mean the forming of another great department of the Government, with its many ramifications and duties, and large numbers of clerks, stenographers, and help. The Navy uses its existent machinery to take care of aviation work, and the extra numbers of

offices and personnel needed for aviation is very small. A combination would mean offices and many more Government clerks assigned to the military service. It would immediately set up duplication, which is a most wasteful form of extravagance. The procurement division of the Army Quartermaster's Department and the Bureau of Supplies and Accounts of the Navy have proved themselves to be unusually efficient organizations, and they are fully competent to purchase and contract for all the aircraft that the Army and the Navy will need.

During the war the most important consideration was for standardization and quantity of production. In peace times, however, the rapid changes in aeronautics make it imperative that the time be spent in experimentation. If we want to keep abreast of other nations, we must exert ourselves to the utmost, and a single source of supply would tend to standardize and thus hurt progress by killing competition.

The issue of production was befogged during the war by naval aviation getting involved in projects not properly coming within its sphere, notably the northern bombing crews project.

Mr. LaGuardia. Was that a success?

Lieut. Commander Byrd. It did not have time to develop; I think it would have been successful.

Mr. LaGuardia. With land machines?

Lieut. Commander Byrd. With land machines.

At the time the matter of the northern bombing crews was considered, the submarine was a great menace, and there appeared sufficient reasons for the Navy Department's undertaking to bomb submarine bases. These reasons were concurred in by the War Department. But in retrospect, Army aviators contend that this project was a military and not a naval matter. Nevertheless, the Navy called upon the Army for a number of airplanes of the military type, and while the number was comparatively small this demand furnished the sponsors of a combined production scheme sufficient justification in stating that similar airplanes were used by both the Army and the Navy. It is not likely that such an example will occur again. Further to befog this issue—not with that intention, of course—the Army has called on the Navy to furnish it with flying boats for some of its aviation stations on the coast. But even if in some few cases both services use the same types of aircraft, it does not argue for a combined air force.

The bill as drawn (H. R. 9804 and S. 3348) creates a military organization of 7,016 officers and 50,000 men. This would be a highly specialized body and a "closed service"; there could not be the present give-and-take, by which officers and men can shift back to other military or naval branches, or from those to the Air Service, as their qualifications changed. It would start with a young personnel, quite well acquainted with either the Navy or the Army, and for a few years it might bring good results. But the disadvantage of the step would become most evident after a few years of discontinuance of association had got them out of touch with the Navy or the Army, and when their years began to tell they would all be growing old together, and the only way to retain efficiency would be by extensive retirements to make way for the young blood.

Officers and men of a separate service can not be fed into the regular ranks of the Army and Navy when they cease flying, as is the case at present, and these individuals would become pensioners upon the Government at an early age.

On November 12, 1919, Gen. Seely, of the British Air Service, made an impressive point in his speech in the House of Commons, when he spoke of the impossible situation created by the necessity of the British Admiralty applying to the war minister for the allotment of aircraft for naval activities.

It is evident that as time goes on naval types of aircraft will become more and more differentiated from Army types, just as civil types will be different from both of these.

One of the most striking utterances of Gen. Haig was that aviation alone can never force a decision, but must rely upon the infantry. The same thing applies to the Navy—a decision can be forced only by surface craft. The air is not a separate war area, but is used equally by armies and navies alike.

Mr. LaGuardia. Who said that?

Lieut. Commander Byrd. I think I have heard Capt. Craven say that. A war can be fought without aircraft, but it would be impossible to carry on a war without the Navy or without infantry.

In the final issue, the decision must be made with one paramount object in view, namely, to make aviation of the greatest possible value to our country by placing its efficiency on the highest plane. The Navy feels that the forming of a combined air force would be a great error, and must protest in the strongest terms against such a radical method. All of the advantages claimed for a united air force can be obtained by hearty cooperation between all of the branches of the Government having to do with aeronautics. The Joint Army and Navy Board on Aviation, by frequent meetings, recommendations, and reports, can bring about close cooperation between the Army and the Navy. The Navy believes in this cooperation, and not in amalgamation.

The bills (H. R. 9804 and S. 3348) are drawn up to organize a new Department of Aeronautics along strictly military lines. Therefore, it is to be supposed that national defense is the main thing in view. History has shown that it is of vital importance that a warring nation, whose borders are touched by the sea, have close cooperation between its land and sea forces. The present war affords a very vivid example of this necessity. Past records give sad accounts where the lack of such cooperation has caused the loss of wars and the destruction of nations. The men, therefore, who have a hand in the changing of the present laws must consider their course carefully, for if they bring about a combined air force they make a new defensive department by a combination of vital parts they have taken from the two great fighting departments. They may make close cooperation of the fighting branches of the country more difficult, if not impossible, by creating a third coequal department which must effect far closer cooperation with the other two departments than these two have ever been able to effect in the past. Is not this a dangerous experiment?

The time has not yet come when the Army and the Navy are adjuncts to aviation. When land and sea service fighting units be-

come auxiliaries to the air forces, then, and not until then, we should organize a united air force.

In answer to the chairman's statement that we are making the same arguments that were made when our Army and Navy were separated, I submit that when the Navy was separated from the Army, it was not an adjunct to the Army. Aviation is an adjunct to the Army and the Navy; it is one of their fighting arms. That is all I have to say, sir.

Mr. LAGUARDIA. If there are no questions, that is all, Commander Byrd.

Capt. CRAVEN. I suggest that Commander Whiting be next heard.

Mr. LAGUARDIA. All right. Please give your full name, Commander Whiting.

STATEMENT OF COMMANDER KENNETH WHITING, UNITED STATES NAVY.

Commander WHITING. Kenneth Whiting, commander, United States Navy.

Mr. LAGUARDIA. What is your present assignment of duty?

Commander WHITING. My assignment is to Capt. Craven—operations of aviation.

Mr. LAGUARDIA. Do you desire to make a statement?

Commander WHITING. I am here to answer any questions you wish or to give you my views.

Mr. LAGUARDIA. Well, that is what we wanted—if you will just give us your views.

Commander WHITING. My views on the subject of the united air service are as follows: I think it is vitally necessary at this time, and as soon as possible, for the Government to form some branch to take charge of commercial aviation development; to look out for the examination of pilots, inspection of planes; to make the rules governing air flying; to regulate the procedure in airdromes; to lay out airdromes throughout the country and map them out; and to foster United States commercial aviation in foreign countries.

I am opposed to a third military branch being formed, as I can not see how this third military branch would operate in times of war.

Mr. OLNEY. What do you mean by third military branch?

Commander WHITING. I mean if a united air service is formed, a third military branch in the united air service is formed that is independent of the Army and Navy. That is what I mean by a third military branch. I think both the Army and the Navy should have their own aviation, and the entire military aviation of the country should be divided between the Army and the Navy. Both the Army and the Navy should be permitted to develop the types necessary for their use. The question of production and procurement of planes, etc., might, possibly, be handled under the commercial end; but the experimentation and development of the types necessary for the Army and the Navy should be controlled entirely by the Army and the Navy.

Mr. LAGUARDIA. How about the training of the men?

Commander WHITING. The question of primary training, which now takes about 10 hours, might be under one head. The final advanced training should be done by the Army and Navy.

Mr. LaGuardia. You would not consider a man after his primary training of 10 hours in the air an experienced pilot, would you?

Commander Whiting. Not at all.

Mr. LaGuardia. He would have to put in a lot of time in the air after that, would he not?

Commander Whiting. Yes; but that time should be put in in advanced training for the branch of the service that he is to serve in. I think that about sums up my views.

Mr. LaGuardia. Then, after he finishes his preliminary training, suppose we are going to make a combat pilot out of him. There is no reason why that could not all be combined in one department, is there? I mean fighting in the air.

Commander Whiting. Possibly. All acrobatics could be taught in one school; yes; but not the tactics.

Mr. LaGuardia. Could not bombing also be taught in that way?

Commander Whiting. I do not think so.

Mr. LaGuardia. How would you differentiate them?

Commander Whiting. Well, it would depend entirely on the type of plane and tactics to be used for bombing.

Mr. LaGuardia. Well, just take bombing in itself; after all, it makes no difference what machines you are using, does it?

Commander Whiting. It makes a great difference.

Mr. LaGuardia. For the bombing operation itself?

Commander Whiting. A great difference; yes.

Mr. LaGuardia. How?

Commander Whiting. Well, there are numerous types of bombing machines—day bombers and night bombers. We use seaplanes for bombing and bomb from very low altitudes.

Mr. LaGuardia. But the adjustment of sights and the bombing itself?

Commander Whiting. Well, the sights will vary with the type of planes that is used. We are developing a telescopic sight that, perhaps, it would not be possible to put on a small type of day-bombing plane.

Mr. LaGuardia. That is the only kind of telescopic sight we ever used, and we used it in the daytime; we could not use it at night.

Commander Whiting. I never saw any telescopic sights used abroad during the war.

Mr. LaGuardia. What I want to find out is why the type of machine would be different? It seems to me that you could train a man to bomb in any machine, as far as his bombing training goes.

Commander Whiting. Well, you and I differ on that.

Mr. LaGuardia. All right. How about aerial navigation?

Commander Whiting. Aerial navigation is divided into two parts: navigation over the land and navigation at sea. In navigating over the land you have certain points of land that are visible to you, and in navigating over the sea you have nothing but the sea, and your drift can not be closely calculated.

Mr. LaGuardia. You have no way of accurately measuring your drift now, have you?

Commander Whiting. Not a very accurate system; no, it is quite a difficult point to settle.

Mr. LAGUARDIA. Well, do you not think it would be a good thing if all flyers learned navigation?

Commander WHITING. Yes; I think all flyers should learn navigation. We teach all our pilots navigation.

Mr. LAGUARDIA. I do not mean by that just to discern objects on the land and be able to follow a given path; but I mean to be able to navigate in the air, if they were flying at night, for instance?

Commander WHITING. Yes; I think that is very desirable, and we insist on it in the Navy.

Mr. LAGUARDIA. Now, why could not that be given in common?

Commander WHITING. Well, I guess perhaps it can, though the navigation at sea will require navigating over the sea, and a great amount of practice is necessary to the pilots in perfecting themselves, and that navigation will require flying in planes that go to sea and are built for that purpose.

Mr. LAGUARDIA. Yes.

Commander WHITING. And I doubt if you can teach a man all of that as well as all his other numerous duties.

Mr. LAGUARDIA. But the art of navigating would be the same, would it not?

Commander WHITING. Just the same; it does not vary.

Mr. LAGUARDIA. On the question of production, how much of that do you believe could be combined?

Commander WHITING. In an emergency in war time I think perhaps it would be better to combine the whole thing. During peace time, where you are only developing experimental types and developing those in fairly small numbers—for I do not think that in peace time we can hope to have more than a skeleton of aviation——

Mr. LAGUARDIA (interposing). You do not feel, then, that a united air department, with its naval branch and its military branch and its civil branch, would carry on these functions satisfactorily in time of peace?

Commander WHITING. No, sir; I do not. I think you would get into the same troubles that England got into in the Royal Aircraft factory.

Mr. LAGUARDIA. Well, we got into some trouble in production here, did we not?

Commander WHITING. Yes; I think you did.

Mr. LAGUARDIA. Commander Whiting, do you consider the present system in the Navy—the bureau system—for aviation satisfactory?

Commander WHITING. No; decidedly not; but that is a thing in our own family, that can be straightened out in time; that has nothing to do with the united air service.

Mr. LAGUARDIA. Why not?

Commander WHITING. When the demand comes for planes for the fleet, the proper steps will be taken to develop them. I admit that they are going very much slower than I would like to see them—very much slower.

Mr. LAGUARDIA. It is the same with the Army. And that is why we believe that if we take these activities away from the Army and the Navy and the various departments and concentrate them in some other department, they would go more rapidly.

Commander WHITING. I agree with you entirely as to the development of planes—you would probably get faster planes; all aeroplanes would develop faster under a united air service than they would under the Army and Navy system; but in the end you would not have what you wanted.

Mr. LAGUARDIA. What is that?

Commander WHITING. You will not have types that are satisfactory to the Navy and satisfactory to the Army. They may be satisfactory to the people that belong purely to the united air force, but they will not do the work they are supposed to do for the Army and Navy.

Mr. LAGUARDIA. The very fact that we can develop aviation—would not that have a tendency to speed up the development in naval and military planes? Certainly, it would be better than the present condition.

Commander WHITING. I do not agree with you—though I am. It would develop planes, perhaps, that would be faster, and have more refinements; but they would not be suitable for the work intended; they would be developed entirely by people in the air, not coordinating with the people in the Army and in the Navy.

Mr. LAGUARDIA. It would give us a development in motors, do you not think so?

Commander WHITING. Yes—a very needed development.

Mr. LAGUARDIA. And would not that be a benefit to both the Army and the Navy?

Commander WHITING. Yes.

Mr. LAGUARDIA. So that that is something in itself?

Commander WHITING. Yes.

Mr. LAGUARDIA. You were a flyer during the war, were you not, Commander?

Commander WHITING. Yes.

Mr. LAGUARDIA. The largest part of your aviation forces were reserve men, were they not?

Commander WHITING. Yes, sir; 99 per cent, I should say, or more.

Mr. LAGUARDIA. They rendered satisfactory service, did they not?

Commander WHITING. Very satisfactory.

Mr. LAGUARDIA. That is all I have to ask.

Mr. FULLER. In a united air service, so far as the manufacturing goes, you are fearful that the manufacturing department would give the Navy something they did not want, are you?

Commander WHITING. Yes, sir; or perhaps not the quantities we wanted—or both.

Mr. FULLER. If the manufacture was united, why would not the Navy requisition what they wanted?

Commander WHITING. Well, requisitions can be disapproved.

Mr. FULLER. That would not be my idea of the proper cooperation. I should think you could requisition what you wanted and get it, subject to suggested improvements that you would not have to accept.

Commander WHITING. Subject to the approval of the air force, is what it would wind up in; and the man on the outside would be deciding whether the Army and the Navy should be permitted to have a certain number of planes.

Mr. LaGuardia. Well, the Navy can not get all the battleships it wants now, can it?

Commander Whiting. No.

Mr. LaGuardia. There are always limitations.

Mr. Fuller. In a business institution, the purchasing department does not tell the other departments what they shall have; and I can not understand why it would work out that way in this service.

Mr. LaGuardia. That is one of the things we are trying to find out from you, Commander Whiting. You say that now you are not getting everything you want as rapidly as you want it from your own department, under present conditions. Is that correct?

Commander Whiting. Yes. I would like to add, speaking of the reserve officers during the war, that during this last war naval aviation was called upon only to look out for antisubmarine work, and that all of the reserve officers and all of the regular officers that were engaged in aviation, did primarily only that duty. Now, the development toward the latter part of the war, particularly in the British fleet, was toward what we call "fleet" aviation—planes that will operate with the fleet in time of battle and prior to battle. None of our reserve officers were trained in that work, or required to do any of that duty. Had they been, they would have required considerably more training than they had—than we were able to give them during the war.

Mr. LaGuardia. Well, there was no occasion for it, was there? It was not anticipated work that you had before you in the Navy, was it?

Commander Whiting. No; it was not anticipated, because it was thought that the British and American fleets could lick the German fleet. Had they not done that, or been able to do that, there would have been an immediate call for it.

Mr. Fuller. What is the difference between an engine in a bombing plane in the Army and in the Navy?

Commander Whiting. Well, the only difference between engines in Navy planes and Army planes is the question of compression. Most of our work is done at low altitude, and we do not require such high compression.

Mr. Fuller. But there is no difference in the engine?

Commander Whiting. There is no difference; it is an identical engine. It is only a question of changing the piston and getting a piston that gives more or less compression.

Mr. Fuller. You could draw from one common stock, could you not?

Commander Whiting. Yes, sir.

Mr. Fuller. Would that not be a possible advantage in uniting that service there?

Commander Whiting. In the production of engines? That is what we do now.

Mr. Fuller. Would not the united service be more secure in its stock on hand, in that it could be allocated either to the Army or to the Navy?

Commander Whiting. It would seem the more logical business way to do it to have one service building all the engines.

Mr. Fuller. I suppose that also applies to some other things besides the engines—the propellers, for instance?

Commander WHITING. Yes; the propellers, and a great many other things—the instruments, engines, machine guns, sights, accessories, etc.

Mr. FULLER. And would it not naturally follow that there would be great duplication in having those separate?

Commander WHITING. No; I do not think so. I do not think there should be two or three companies building the same type of engine for the Navy to draw from one or the other; that should be done from the joint board to avoid duplication. That is what the duties of the joint board are.

Mr. OLNEY. It has been testified here that there are several boards operating, and that you are more or less trying to avoid duplication and confusion?

Commander WHITING. Yes.

Mr. OLNEY. By uniting such boards, or dispensing with two or three boards. Of course, the object of the united air service is just to have one board, or one executive authority; and it would seem to me that there would not be this duplication; that you would have coordination and you could cooperate.

Commander WHITING. It looks very nice until you come to the question of operations.

But I can not conceive of how the thing is going to operate in war time—this third military service, this air force. We will take a Pacific campaign, for instance: If there is a campaign in the Pacific it will be primarily a naval campaign. Now, with this united air service proposed, everything would have to be transported to field of action, some 6,000 or 7,000 miles; and it is very likely that those planes would have to operate from ships, or from temporary bases, which would change from day to day. Now, who is going to do that? The Navy? And who is going to direct it? If it was a naval campaign, it would be under an admiral, and all the forces operating should be under him.

Mr. LAGUARDIA. The bill provides that.

Commander WHITING. I know it does; but what is the use of having this third military service. If you provide the navy with a sufficient force they can operate it themselves.

Mr. LAGUARDIA. But that is just one of the functions of the Air Service.

Commander WHITING. What other functions are there in a campaign on the Pacific?

Mr. LAGUARDIA. We will grant you that. Your operations under the fleet will be entirely under the control of the commander of that fleet.

Commander WHITING. All right; let us take a campaign on this continent, in which we go north or south—either way.

Mr. LAGUARDIA. For international reasons, let us assume that we are going south? [Laughter.]

Commander WHITING. Well, primarily, it would be an Army campaign.

Mr. LAGUARDIA. Yes.

Commander WHITING. And the general in command of the force would have certain objectives that, perhaps, he would want bombed.

Mr. LAGUARDIA. Yes; he would have certain objectives that he would want bombed.

Commander WHITING. Yes; and he would bomb those through the Air Service.

Mr. LAGUARDIA. Yes; and he would have certain observations which he would want made, and he would carry that out.

Commander WHITING. Yes; but why not do it through his own forces? Why have a third force that he must apply to and do it through that——

Mr. LAGUARDIA (interposing). Just a moment. Assuming that it was necessary to destroy a line of communications of the enemy, and that that was purely an aerial operation requiring a big force, once the commanding general had outlined what he wanted done, do you not think that the air force would be the best judge of how it should be done?

Commander WHITING. Yes.

Mr. LAGUARDIA. Here is another thing. The observations——

Commander WHITING (interposing). I think the man who was in command of the detachment probably could do it better than anybody else.

Mr. LAGUARDIA. Now, your observation forces could not function if the enemy had a powerful air fleet, could it?

Commander WHITING. If more powerful than we had; not at all times.

Mr. LAGUARDIA. Therefore, it would be necessary for our side to clear the enemy of aircraft before the observation planes could properly function—or to properly protect the observation planes; is that not true?

Commander WHITING. No.

Mr. LAGUARDIA. That is not true?

Commander WHITING. No. I think that the Germans made their observations whenever they wanted to, and yet we claimed supremacy in the air.

Mr. LAGUARDIA. We claimed it; but the fact that we claimed it—was not that the best proof that we did not have it in that sector?

Commander WHITING. To my mind; yes.

Mr. LAGUARDIA. Now, as to the matter of fighting, do you not think that that which is purely aerial should be left with the air force?

Commander WHITING. Yes; but I would still have that air force under the command of the commander in chief.

Mr. LAGUARDIA. All operations at that point?

Commander WHITING. Yes; or at any other point.

Mr. LAGUARDIA. Yes; the same would apply if there was a joint land and sea operation; it would be under the man who was in command of the major operation, would it not?

Commander WHITING. Yes; there is no necessity of a third force; you could have it either in the Army or in the Navy; if it becomes necessary for a combined force, the senior officer takes command, as in all other cases.

Mr. LAGUARDIA. But would you stop at two forces? You would not go further?

Commander WHITING. I would not.

Mr. LAGUARDIA. But suppose the operation is aerial? Do you think that is possible in the future?

Commander WHITING. No; not in the near future; but at some time in the distant future.

Mr. OLNEY. Of course, we are considering in the back of our minds the chances of another war; and that is why now, in our reorganization bill, we are, perhaps, seeking universal military training and better organization of the National Guard, and a very good-sized Regular Army, so that when the war does come we can meet the emergency at once; because, as you know, in this late war we had to train men for a year before we were prepared to go into the war. So that that would be in the back of the minds of some of us who favor the united air force—that when the time came the new air force might have developed aviation to such an extent that when the emergency came we would be ready for it; that was all. If that could be done better in your way, all right.

Mr. FULLER. In some respects, you think, it could be united, do you?

Commander WHITING. Yes; I think that the commercial force that I spoke of could be intimately connected with the Army and the Navy, so that they could adapt their types of planes, to a certain extent, to the types that would be useful in war time. And also I think such commercial aviation as may be developed should be allocated or assigned, right now, at this time, to work with the Army or with the Navy, according to their training, in case of war, and that would be part of the large reserve that it is necessary to build up. We can only hope to have a skeleton aviation force in peace times in the Army and Navy; but we can make our plans so that in war times we call in all those civilian pilots and know just which branch of the service they ought to be assigned to.

Mr. FULLER. But you would not consider that it was practicable to consider in this primary work—such work, for example, as carrying the mails?

Commander WHITING. No, sir; I think you would very soon wear out your pilots. For instance, take the pilots in the Post Office Service. How many pilots are there in the Post Office Service who have been flying two years? I think there is one; the rest of them have got all the flying they wanted—or they are dead or have left the Postal Air Service.

Mr. FULLER. I did not mean for any length of time. But it would seem to me that if these men are going to fly, they could be used for practical purposes.

Mr. LAGUARDIA. For useful purposes.

Mr. FULLER. For useful purposes; yes.

Commander WHITING. Those are all functions of other bureaus; and there is no question that if you attempt to take them away from those other bureaus of the Government you are going to meet strong opposition.

Mr. LAGUARDIA. Does not the Navy carry any mails at all?

Commander WHITING. No, sir; except official mails. When the Navy Department wants to send some official mail to Hampton Roads in a hurry, they assign a plane to that duty.

Mr. LAGUARDIA. Well, I did not mean by plane; I mean by boat.

Commander WHITING. By boat? I do not think so; it goes to the flagship and then is distributed in that way.

Mr. LaGuardia. I did not mean that. I mean regular mail.

Commander Whiting. They do have a post office on each battleship.

Mr. LaGuardia. I know; but that is for their own use.

Commander Whiting. Yes.

Mr. LaGuardia. But do you not believe it would be useful to have men who are in the service, both in the Army and in the Navy—or in a separate force—put in their flying time in a useful occupation, such as carrying mail and Geodetic Survey work—map making?

Commander Whiting. No, sir; I do not think so. I think that time should be devoted to military training.

Mr. LaGuardia. Well, experience in the air is valuable——

Commander Whiting (interposing). They do not have a great time to train.

Mr. LaGuardia. That is just it.

Commander Whiting. And we have to prepare our material for this training, and then do the training in a fairly short time.

Mr. LaGuardia. But after a man has received this training, do you not think that a year of flying would be very valuable?

Commander Whiting. I do not think a year spent in carrying the mails would be valuable at all. That is, I think when we got that man he would be so disgusted with flying that he would be of little military value to you. I think if you were to take a pilot now and start him out on a flight from here to Cincinnati and back, daily, or as often as he could make it, at the end of a year he would have had about all the flying he wanted, and he would be quite willing to loaf on the job if he had an opportunity.

Mr. LaGuardia. You think he would grow stale, do you?

Commander Whiting. I am sure he would if you forced him to fly in any weather, which is practically what the Post Office Department does. I think the same will be true later on with the Forest Service patrols, where they will go out in all kinds of weather and have forced landings in the middle of a forest.

Mr. LaGuardia. Yes; there are some very unpleasant features in that. That is all, commander.

Who is your next witness, Capt. Craven?

Capt. Craven. Lieut. Commander Griffin.

STATEMENT OF LIEUT. COMMANDER V. C. GRIFFIN, UNITED STATES NAVY.

Mr. LaGuardia. Please state your name and position.

Lieut. Commander Griffin. V. C. Griffin, lieutenant commander, attached to the Navy Department.

Mr. LaGuardia. Let us have your views on this subject. You have heard the testimony given to-day.

Lieut. Commander Griffin. My views relative to a united air service are in accord with those just expressed by Commander Whiting—that I am opposed to the formation of a united air service which will control the operations or personnel of the Army or the Navy, or interfere with the operation or training of personnel for aircraft for military service. I think it is possible that an organization, a separate organization, might be established to foster civil aviation, and perhaps

to produce aircraft for civil purposes, and perhaps centralize some of the production for the Army and Navy, such as engines.

Mr. LAGUARDIA. To what extent would the Navy cooperate with such a department?

Lieut. Commander GRIFFIN. They should cooperate by means of some united board, or general board, as they now cooperate with the Army.

Mr. LAGUARDIA. As they are now supposed to cooperate with the Army?

Lieut. Commander GRIFFIN. I believe they do cooperate to some extent.

Mr. LAGUARDIA. Satisfactorily?

Lieut. Commander GRIFFIN. I believe fairly satisfactorily.

Mr. FULLER. I would like to ask this question: I suppose, for example, that it would be very important to have an experimental department for the development of motors in the Navy Department, would it not?

Lieut. Commander GRIFFIN. Yes, sir.

Mr. FULLER. That would be very essential?

Lieut. Commander GRIFFIN. Yes, sir.

Mr. FULLER. And that experimental department would have power to adopt new types of engines, under this bill, would it not?

Lieut. Commander GRIFFIN. Yes, sir.

Mr. FULLER. Now, why could they not combine that work as between the Army and the Navy?

Lieut. Commander GRIFFIN. I think that could be combined in a way; but it would, perhaps, produce an engine that the Army needed and that the Navy did not.

Mr. FULLER. Is there much difference between the engine that the Army uses and the one the Navy uses?

Lieut. Commander GRIFFIN. Not at present; I believe just now the Navy is looking for a type of engine for which there is no demand in the Army, that I know of.

Mr. FULLER. What type of engine is that?

Lieut. Commander GRIFFIN. It is an air-cooled, high-power engine. I do not know that there is any demand for it in the Army. But it is perfectly possible that we might wish a type of engine that the Army had decided was of no use to them, and did not intend to develop.

Mr. FULLER. It would seem that there are many things that could well be combined; but unfortunately, those who have appeared before the committee are very extreme in their views; they either think everything can be combined, or that absolutely nothing can. It would seem as if, as a mere matter of economy, many of the things could be combined.

Lieut. Commander GRIFFIN. I think that many of them could be.

Mr. FULLER. Of course, if they have all the money they wanted for aviation in every department of the Government, that would be an ideal condition. But I doubt it.

Mr. LAGUARDIA. How far have you progressed in your development of an air-cooled motor in the Navy?

Lieut. Commander GRIFFIN. We have an air-cooled engine that is working very satisfactorily now.

Mr. LAGUARDIA. What horsepower is it?

Lieut. Commander GRIFFIN. Sixty horsepower.

Mr. LaGuardia. Is it low compression or high compression?

Lieut. Commander Griffin. I think it it high compression.

Mr. LaGuardia. Is it a rotary engine?

Lieut. Commander Griffin. No; a 3-cylinder, air-cooled, radial engine.

Mr. LaGuardia. Well, that is nothing especially new, is it?

Lieut. Commander Griffin. In America, yes.

Mr. LaGuardia. Well, that would be very useful to the Army also, would it not?

Lieut. Commander Griffin. I do not know whether they wish that or not; they have not developed any that I know of.

Mr. LaGuardia. Do you know what their wishes are in the matter?

Lieut. Commander Griffin. I do not.

Mr. LaGuardia. I thought you had some sort of coordination?

Lieut. Commander Griffin. Well, engines are not my business in naval aviation; we have officers that know more about that than I do.

Mr. LaGuardia. Where was this engine developed?

Lieut. Commander Griffin. In America.

Mr. LaGuardia. Where?

Lieut. Commander Griffin. In New York, I believe.

Mr. LaGuardia. Is it a naval development?

Lieut. Commander Griffin. It is used in naval plans.

Mr. LaGuardia. Well, is it a naval development, or that of some private concern?

Lieut. Commander Griffin. It is a development of some private concern, but urged by the Navy.

Mr. LaGuardia. Yes; I see. I was under the impression that it was a Navy development. That is why I asked you about the Army knowing about it.

Lieut. Commander Griffin. No; I do not believe that engine would be of any use to the Army at present in any plans that they have.

Mr. LaGuardia. That is interesting; tell us why.

Lieut. Commander Griffin. It is too small to serve long for their purposes.

Mr. LaGuardia. It is 60-horsepower?

Lieut. Commander Griffin. Yes; we have a purpose for which that horsepower is quite satisfactory, I think.

Mr. LaGuardia. What would you use it for?

Lieut. Commander Griffin. For very small aeroplanes, which could not compete, I think, in the scouting work of the Army planes.

Mr. LaGuardia. Would you fly them off of ships?

Lieut. Commander Griffin. Off of very small ships; and they could add to the visibility of a small ship—a destroyer or a scout cruiser—just add a couple of hundred of miles to its range of scouting in a day; and, to fly off of those little ships, we want a very small aeroplane and as small an engine as we can afford to carry.

Mr. LaGuardia. Well, a small scouting machine is always desirable, is it not?

Lieut. Commander Griffin. Yes; but this is even smaller than the scouting machines that are the general trend of development in military aviation, as I have seen it.

Mr. FULLER. I would like to ask this gentleman what he thinks should be combined in the two services, if anything?

Lieut. Commander GRIFFIN. Well, sir, if there ever appeared an engine that was satisfactory to both the Army and the Navy, the production of that engine could easily be combined under one head—such as the Liberty engine. Instruments could certainly be combined, or certain instruments that we use in common. Certain woods, the source of supply of aircraft woods; the material used in making aircraft linen, and things of that nature could be combined, I believe, without any injury to either service. But the combination of those things could not be combined, in my opinion; it would be very hard to do it.

Mr. FULLER. You do not think that the Navy Department could requisition what they wanted from one production department?

Lieut. Commander GRIFFIN. I do not believe we would get satisfactory results for our purposes if we did.

Mr. LAGUARDIA. That is all, Commander. Thank you.

Capt. Craven, have you anybody else whom you wish to present?

Capt. CRAVEN. I suggest that Mr. Frost speak next.

STATEMENT OF LIEUT. COMMANDER H. H. FROST, UNITED STATES NAVY.

Mr. LAGUARDIA. Please state your name and assignment.

Lieut. Commander FROST. H. H. Frost; lieutenant commander in the Planning Division of Operations.

I will not touch upon the points that have already been made; but I think a few points might be emphasized.

In August of this year, what was known as a Joint Planning Committee was appointed, three members of the Army General Staff and three officers from the Office of Naval Operations for the Navy.

Mr. LAGUARDIA. Who are the three officers of the Army? Can you tell us that?

Lieut. Commander FROST. Col. Palmer, Col. Gulick, and Col. Kingman.

Mr. LAGUARDIA. Well, they were not flyers?

Lieut. Commander FROST. No; this is in regard to a statement about the joint board.

Mr. LAGUARDIA. I see.

Lieut. Commander FROST. Before that time, the members of the Joint Board of the Army and Navy being very senior officers, had no time to go into the details of planning. Since that time, however, I think you will find that cooperation between the Army and the Navy has increased about 100 per cent; and I think that will eventually do away with a great deal of the trouble arising from lack of cooperation between the Army and the Navy.

The second point I would like to emphasize is the fact that in this war most of the naval aviation was carried on from shore stations, and in the future the fleet aviation will be the main thing, as far as the Navy is concerned. It will be two or three times as important as the shore aviation; and especially in a Pacific campaign it will be practically the whole thing. And our aviation—naval aviation—must be such that it can be carried with the fleet for 6,000 or 7,000 miles

and operate with the fleet. The shore stations on the Pacific coast would be practically a matter of no importance at all.

Mr. LaGuardia. Then a system which would leave to the Navy entire control of the personnel and the equipment of the aviation that the fleet carries with it, and assign to a separate force the landing duties and the shore duties, would be satisfactory?

Lieut. Commander Frost. I do not think so.

Mr. LaGuardia. Tell us why.

Lieut. Commander Frost. Of course, that matter has been gone into before, and I agree in that matter very generally with Commander Whiting, who has testified. I handed in a paper almost identical with his testimony several weeks ago. I may state that I am not at present under the orders of Capt. Craven in any respect, and, therefore, would not be influenced in any way by the policy of the department. I am in an entirely separate office and on a separate duty.

Mr. LaGuardia. Well, there is no reason operations, such as the Coast Guard, bombing from the coast or returning to the coast from operations over water, should be under the complete control of the Navy, is there?

Lieut. Commander Frost. Well, I think it is quite important in operations from the coast, especially if we were engaged in a defensive campaign, to have information of every enemy ship.

Mr. LaGuardia. Exactly.

Lieut. Commander Frost (continuing). Which reaches a position within 300 or 400 miles from the coast. And in order to do that, I think it would be extremely desirable and necessary that our aircraft should be manned by trained naval men, who would be able to recognize those ships immediately.

Mr. LaGuardia. You do not think that a flier who does not belong to the Navy could recognize a ship?

Lieut. Commander Frost. Not the different classes of ships—that is, from some considerable distance. He can not get right on top of the ship, of course, due to the antiaircraft guns.

Mr. LaGuardia. Well, could he not be trained to recognize it the same as he would be trained if he wore the Navy uniform?

Lieut. Commander Frost. He could not be trained to recognize it as well as a regular naval officer could. Then, also, you have the bombing of submarines. I did not have the fortune to actually see any enemy submarines, but we made a great many experiments down at Key West during the war, and I suppose I had about 25 hours of actual observation of submarines under water, and I can assure you that it is an extremely difficult thing to distinguish them; the first time a man went out he could not see them at all.

Mr. LaGuardia. No.

Lieut. Commander Frost. Where other people could see them perfectly. Of course, I must mention the fact that those waters there are clear and not like the waters in the war zone.

Mr. LaGuardia. When you stated that the first time a flyer went out he could not distinguish submarines at all, but that later he could distinguish them perfectly, you were speaking from your experience gained by reason of the fact that you were flying over those waters and had 25 hours of practice on it; is that not the fact?

Lieut. Commander Frost. Yes.

Mr. LaGuardia. And not because you were four years at Annapolis?

Lieut. Commander Frost. Well, the four years at Annapolis would not have so much effect; no.

Mr. LaGuardia. No; that is what I am trying to bring out. Have you anything else that you want to say?

Lieut. Commander Frost. No, sir; nothing else.

Mr. LaGuardia. Have you any more witnesses, Capt. Craven?

Capt. Craven. Not unless you wish to hear Maj. Cunningham, a Marine Corps aviator. He has nothing special to say, except to corroborate what has already been said.

Mr. Fuller. All right; I suggest that we hear him.

STATEMENT OF MAJ. A. A. CUNNINGHAM, UNITED STATES MARINE CORPS, IN CHARGE OF MARINE SECTION OF NAVAL AVIATION.

Mr. LaGuardia. Will you state your full name and your present assignment to duty?

Maj. Cunningham. A. A. Cunningham; officer in charge of the marine section of naval aviation.

Mr. LaGuardia. Has the Marine Corps its own aviation service?

Maj. Cunningham. No; it is just one of the sections of naval aviation.

Mr. LaGuardia. You have your supplies in common, I suppose?

Maj. Cunningham. Yes; our supplies are in common.

Mr. LaGuardia. And how about your training?

Maj. Cunningham. The training is in common, except some of the advanced training.

Mr. LaGuardia. The training is done at the Marine Corps station at Quantico, is it?

Maj. Cunningham. At Quantico and at Paris Island, S. C.

Mr. LaGuardia. Is the Army training any of your men?

Maj. Cunningham. None at all.

Mr. LaGuardia. Does the Marine Corps fly land planes or water planes, or both?

Maj. Cunningham. They fly both.

Mr. LaGuardia. But they are mostly land, are they not?

Maj. Cunningham. At present they are mostly land machines.

Mr. LaGuardia. What is there about the Marine Corps aviation that makes it different from the Army aviation?

Maj. Cunningham. Well, the fact that they specialize also in water flying, to a great extent; they specialize in water flying as well as in land flying.

Mr. LaGuardia. You flyers, however, are not navigators in the maritime sense, are they?

Maj. Cunningham. They take exactly the same course as the Navy flyers; they go through the naval school at Pensacola.

Mr. LaGuardia. True; but they have not the fundamental education that the officers at Annapolis have, have they?

Maj. Cunningham. Practically all that I know of now are either graduates of Annapolis or college men.

Mr. LaGuardia. But not seamen?

Maj. CUNNINGHAM. Not unless they have been to sea on the battleships.

Mr. LAGUARDIA. What operations do you train these men to carry on?

Maj. CUNNINGHAM. Our main mission is expeditionary duty and seizing and protecting advanced naval bases.

Mr. LAGUARDIA. Well, you train your aviation forces to cooperate with your main forces, particularly in a landing operation; do you not?

Maj. CUNNINGHAM. Yes; and particularly to cooperate with naval forces at naval bases.

Mr. LAGUARDIA. Where you are protecting property?

Maj. CUNNINGHAM. Where we are defending a base on land.

Mr. LAGUARDIA. What is there about your service that could be carried on by a separate united air force?

Maj. CUNNINGHAM. I do not think there is very much that could not be carried on. There is not very much in the Marine Corps aviation work that could not be carried on with a separate service. unless they are stationed with the fleet—unless they should be assigned to duty with the fleet. Then I think they would need——

Mr. LAGUARDIA (interposing). Special fleet training?

Maj. CUNNINGHAM. Special fleet training.

Mr. LAGUARDIA. If there are no further questions, that is all. Thank you, Maj. Cunningham.

Have you any further witnesses, Capt. Craven?

Capt. CRAVEN. You have heard all of the aviators. The only people remaining are the bureau representatives, who know the technical matters relating to aviation in the Navy Department as related to their respective bureaus. We have representatives of the bureaus here, besides Commander Hunsaker.

Mr. LAGUARDIA. We would like to hear one of them.

Capt. CRAVEN. Which bureau?

Mr. LAGUARDIA. One of the major bureaus.

Capt. CRAVEN. You have heard from Construction and Repair; the other major bureau is Engineering. I will ask Commander Atkins to speak.

STATEMENT OF COMMANDER A. K. ATKINS, UNITED STATES NAVY.

Mr. LAGUARDIA. What is your assignment?

Commander ATKINS. I am in the Navy Department, Bureau of Steam Engineering. I have to do with the power plants of aircraft.

Mr. LAGUARDIA. That is, the motors?

Commander ATKINS. That is, the motors, the propellers, tanks, instruments, etc.

Mr. LAGUARDIA. What other function has that bureau? What are its chief functions in connection with ships?

Commander ATKINS. It has the same things to do with ships; it has to do with the power plant on ships, the propulsive apparatus.

Mr. LAGUARDIA. You say that you have control of motors entirely?

Commander ATKINS. Yes, sir.

Mr. LAGUARDIA. And also propellers?

Commander ATKINS. Yes, sir; all of the power plant.

Mr. LaGuardia. Has your bureau developed any men who are specializing in motors?

Commander Atkins. We had men throughout the war, of course, to take up each part of the power plant and specialize on it. One man would specialize on the instruments, and others on the accessories, the propellers, the tank construction, piping, etc., and we cooperated with the Army in the war on motor work entirely.

Mr. LaGuardia. How much of a personnel have you assigned to aviation work exclusively?

Commander Atkins. In the regular service we have two officers in the bureau and one in England and about seven reserve officers at the present time.

Mr. LaGuardia. That is, nine men in all?

Commander Atkins. Yes, sir.

Mr. LaGuardia. Are they carrying on the work satisfactorily?

Commander Atkins. I think we are very much handicapped, owing to the lack of personnel; at the present time there is a general policy looking to the reduction of personnel.

Mr. LaGuardia. Do you not think that a great deal can be done in the development of motors?

Commander Atkins. I think the proper way to do that is to develop the engineering talent of the country and utilize it in that way, because where we could have one or two engineers in the department there could be a dozen in the country—the very best there are—working on that motor development.

Mr. LaGuardia. And you believe that can best be brought about by the present system of a divided aviation force?

Commander Atkins. I think it could be satisfactorily handled; yes, sir.

Mr. LaGuardia. Do you not think it could be better handled with a separate aviation department making a specialty of this, with a sufficient personnel?

Commander Atkins. No; I do not believe it could, sir. We will require a slightly different motor than the Army.

Mr. LaGuardia. In what respect?

Commander Atkins. Some of the officers spoke here about the Liberty motor being geared. It is necessary to have some of our planes flying at lower speeds than the Army service requires; requiring higher propeller efficiency than we can get with a direct-drive motor at the speed of our naval planes. Now, with a land type of machine flying off ships we can probably use the same motor that the Army does.

Mr. LaGuardia. What is being done to develop the present motor?

Commander Atkins. At the present time—we started on July, 1918, to develop the geared Liberty motor. We worked with the Army at the McCook Field ,and we have now got it practically up to a state of test, and have built several——

Mr. LaGuardia (interposing). Several motors?

Commander Atkins. Yes, sir; we used outside talent; the Packard Co. built part; they were the best qualified people for it. We worked with the Army, however, all through.

Mr. LaGuardia. Have you used the Bugatti motor at all?

Commander Atkins. The Army tried it out.

Mr. LaGuardia. How was it?

Commander ATKINS. It was not satisfactory.

Mr. LAGUARDIA. The Government bought that patent, did it?

Commander ATKINS. The Government bought the patent.

Mr. LAGUARDIA. And it was not satisfactory?

Commander ATKINS. As usual with a foreign type, it did not stand transplanting.. The Bugatti motor had to be redesigned; and it did not develop the horsepower required, and it did not do for our use. We experimented with it with the intention of trying to utilize it for naval planes if the Liberty motor fell down.

Mr. LAGUARDIA. With a united air service, the Navy did not have any difficulty in getting the motors during the war, did it?

Commander ATKINS. Well, of course, during the war we pooled our interests—the Army and the Navy.

Mr. LAGUARDIA. Yes.

Commander ATKINS. Through the Aircraft Board, and upon the recommendation of a joint Army and Navy mission abroad, the Navy was to have precedence in its materials for antisubmarine activities. Antisubmarine patrols included aircraft. On that arrangement we were assigned the first engines of the Liberty production. That was not only true of the motor but of all accessories; we pooled our interests; we had certain factories and they had certain factories; and we utilized their inspection service and they utilized ours. And it was the same with instruments and accessories.

Mr. LAGUARDIA. Have you a large supply of Liberty motors on hand?

Commander ATKINS. About 3,500, I think.

Mr. LAGUARDIA. That will last you some time?

Commander ATKINS. That will last us longer than our present program calls for, and we are endeavoring to dispose of some of them.

Mr. LAGUARDIA. What provision have you made for storing those motors?

Commander ATKINS. We have investigated several methods. At the present time it is all done by inspection and overhauling and moving the motors daily. Several suggestions have been tried.

Mr. LAGUARDIA. Have you cooperated with the Army in this respect?

Commander ATKINS. Yes; we have taken it up with them. and several means have been suggested, but nothing has been entirely satisfactory except the man power of testing motors frequently.

Mr. LAGUARDIA. And that requires a lot of personnel, too?

Commander ATKINS. Yes; and careful inspection.

Mr. LAGUARDIA. Is that not one reason why it would be better to have that all together?

Commander ATKINS. Well, I can not imagine an immediate repetition of the conditions as now exist. We are simply stocked up with the surplus acquired during the war; and, of course, it is up to us to preserve that, if possible.

Mr. LAGUARDIA. That is all I have. Any other questions?

Commander ATKINS. I would like to go on record as personally being opposed to the united air force, even down to the question of centralized production and research. I do not think that would be satisfactory.

Mr. LAGUARDIA. You are not a flyer, are you?

Commander ATKINS. No, sir.

Mr. LAGUARDIA. How long have you been assigned to aviation work?

Commander ATKINS. I was assigned to aviation work at the beginning of the war, about April 1, 1917.

Mr. LAGUARDIA. If we maintained the present system, you would be kept along in aviation work, would you not?

Commander ATKINS. I do not believe so. My preference would be to stay with the Navy.

Mr. LAGUARDIA. Well, I am assuming that we continue the present system of two services. Now that you have been in aviation so long, would the Navy keep you on the same work?

Capt. CRAVEN. I think so.

Commander ATKINS. I think so, so far as I am concerned—or at my own request, I could go to other duty.

Mr. SANFORD. You think the aircraft problem is different from the standpoint of the Army and from the standpoint of the Navy, do you?

Commander ATKINS. Yes, sir. As it is now the flyer in the Navy Department has got his eye on the whole thing, until the complete machine is delivered; if it is not satisfactory, he has power to see that it is made right. As it is now, we can order direct from the factory. If it is done through a separate supply department, we would not have the control over it that we now have. If production should be interfered with by certain requirements of the Navy, we would not get our requirements. The aviator would get what would best suit general conditions, under such a plan, and not what he wanted. As it is now, the whole thing is influenced by the aviator, or the flying personnel, from the beginning to the end, in the Navy; and they get what they want.

Mr. FULLER. That is, you say that if you made a requisition for a certain part, for example, you simply would not get it?

Commander ATKINS. I will not say we would not get it; but we would not have the power to compel delivery in a separate supply department or a central research department. The man who has the maximum interest will get what he wants—which, in this case, would be civil aviation. The Government will have to establish some bureau or office—which would probably be in the Department of Commerce—for civil aviation. You have got to have some method of controlling and developing civil aviation; but I do not think you ought to do it by wrecking Army and Navy aviation, and I think the present scheme will do that.

Mr. FULLER. Germany had a pretty successful aviation scheme, did she not?

Commander ATKINS. I am not entirely familiar with the German scheme, but my impression is that it was not a separate department.

Mr. FULLER. I was just speaking of the testimony that has been developed by fliers here; but I did not know that it was connected with the commercial development at all. Is it in France?

Commander ATKINS. I am not fully informed; but the question is, to get a large production in war time, you have got to have capacity in the country. Now, neither the Army nor the Navy is in a position in peace time to give orders to satisfy that production need. It

seems that the commercial demand will have to be so large that it will be the thing that will support that production for war time needs, or we will have the same condition that we had before.

Mr. LaGuardia. That is what we are trying to prevent.

Commander Atkins. But I do not think you should wreck the Army or Navy aviation by doing it.

Mr. LaGuardia. We do not want to wreck the Army and Navy aviation. But witnesses have appeared before this committee representing every factory in the country saying that they will come to a standstill unless something is done.

Commander Atkins. That is because the Army and Navy do not have the funds to support that industry. Now, the demand to meet that production must be supplied; and the Army and the Navy can not supply that demand. Congress will not give the necessary funds; and I do not know how you can stimulate the commercial demand at the present time.

Mr. Fuller. You say you do not think there is any part of the work that could be united to advantage?

Commander Atkins. Yes; I say that to satisfy the Navy 100 per cent.

Mr. Fuller. Yes. Now, let us take up the matter of motors. You said that the difficulty of getting a foreign motor was such that it was advisable to redesign it?

Commander Atkins. It does not stand transplanting to our methods and our materials.

Mr. Fuller. Have we worked that out very successfully to our methods?

Commander Atkins. The Bugatti motor?

Mr. Fuller. Any particular one?

Commander Atkins. There was one example where it was not very successful. The Wright-Martin Co. built the Hispano-Suiza motor for the French Government; it cost them a large sum of money, and it was practically 16 months before they got a motor that would satisfy the French Government.

Mr. Fuller. They had to redesign it?

Commander Atkins. They had to redesign it, and practically rebuild it. It was a question of starting from the ground up on that motor.

Mr. Fuller. It struck me that in our aviation plan the mistake we made was in starting new motors, instead of approving those that had been successful on the other side. Is that your view?

Commander Atkins. No; I do not think so.

Mr. Fuller. Well, you agree that our program has been a failure?

Commander Atkins. No, sir; I will not agree to that throughout. So far as the Navy goes, it was all right.

Mr. Fuller. Well, I was not speaking about the Navy in particular; but I was speaking about the vast sums——

Commander Atkins (interposing). $640,000,000.

Mr. Fuller. One and one-half billions of dollars.

Mr. LaGuardia. The $640,000,000 was only the first appropriation.

Mr. Fuller. Well, I say my understanding is that the mistake we made was in having an all-American motor.

Commander Atkins. No, sir; if that motor had failed, we would not have been anywhere. If that motor had failed, we could not have gotten a satisfactory motor anywhere.

Mr. FULLER. Why could we not bring over a foreign plane and reproduce it?

Commander ATKINS. I can only speak for motors.

Mr. FULLER. Well, they have to go together, do they not? Did we not design a motor that we thought would fit the English plane?

Commander ATKINS. The Army tried to fit the Bristol fighter to the Liberty engine.

Mr. FULLER. Well, it is absolutely essential that the aeroplane and the motor be designed at once, is it not?

Commander ATKINS. Yes; to get the best results; but there was only one motor at that time that would have been suitable for our requirements, and that was the Rolls-Royce. As I remember it the maximum production of the Rolls-Royce was about 50 a week. They had a very large number of people on it, and the motor was costing $10,000. Those figures may not be accurate.

The question of producing that motor was gone into, but the production would not have been near enough to take care of our needs. The thing was to build a motor that would suit our conditions and our manufacturing methods, quantity production, etc., and a motor of which the parts could be built anywhere in the country, so that there would be several sources of supply, and a simple motor upon which American mechanics would be trained. That was our only hope of getting enough motors in production. By the time the war was over the production of motors was approximately 100 per day, and at that time we were satisfying a demand outside of our own services; we were cutting down our own demands to supply England and France.

Now, with regard to the Bugatti motor being transplanted, that motor was not as complicated as the Rolls-Royce. The Wright-Martin Co. had considerable trouble with the Hispano-Suiza motor.

Mr. LAGUARDIA. It turned out all right eventually, did it not?

Commander ATKINS. It was a good motor, but as it turned out it was not the Hispano-Suiza motor as built. General Vehicle Co. had trouble in building the Gnome motor. The Gnome motor in this country was probably superior to that in France.

Mr. LAGUARDIA. We did not produce any, did we?

Commander ATKINS. It got out of fashion, I think, and there was no demand. We purchased, I think, 200 of those.

Mr. LAGUARDIA. That was a pretty expensive experiment, was it not?

Commander ATKINS. We still have some of them. But there was no large demand for the rotary motor at that time.

Mr. FULLER. Just one question: I am probably ignorant on this: How much would it cost for a proper experimental station, with all that that means? That is, it seems to me that those two things could be combined—but perhaps they could not.

Commander ATKINS. I should say $2,000,000, offhand; it would be somewhere in the neighborhood of that. The Army has a fairly good field in the McCook station. We work with the Army there to a slight extent. It is a question, however, of getting control of the individual experiments; we want something done quickly, and we want to get an answer to some question quickly; but our power there is not sufficient.

Mr. FULLER. Would an annual appropriation of $2,000,000 be sufficient?

Commander ATKINS. Yes.

Mr. FULLER (interposing). I mean what would it cost annually to be in a position to make proper experiments for the development of such planes as the Navy needs?

Commander ATKINS. That would be a pretty hard question to answer.

Mr. FULLER. Do you have charge of that?

Commander ATKINS. I have the motor end of it; but we are not looking forward to any such thing as an experimental station at the present time. We have a very small testing laboratory in the navy yard in Washington, about twice the size of this room; we can get answers there to any purely naval questions that we want answered. When it comes to questions of distinctive tests of propellers and certain other work, we ask McCook field to do that work. We keep in touch with their development work; but it would be more satisfactory, from a naval point of view, for the Navy to have its own experimental station.

Mr. FULLER. You have no idea what the cost would be?

Commander ATKINS. What the annual upkeep would be? No; but could figure that out.

Mr. LAGUARDIA. But you are carrying on work now at the McCook field with the Army?

Commander ATKINS. Yes, sir; we ask them to do work for us.

(Thereupon, at 6.30 o'clock p. m., the subcommittee adjourned.)

SUBCOMMITTEE OF COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Saturday, December 13, 1919.

The subcommittee met at 10 o'clock a. m., Hon. Fiorello H. LaGuardia presiding.

Mr. LAGUARDIA. If there is no objection, I would like to insert as a part of this record a letter from Commodore Charlton, the British air attaché to this Government, and also a letter from Capt. DeLavergne, the French air attaché to this Government, both addressed to Senator New.

(The letters referred to are as follows:)

WASHINGTON, D. C., *September 23, 1919.*

MY DEAR SENATOR NEW: I beg to acknowledge receipt of your letter of September 20 and to give you a receipt for the bill inclosed.

It is with great pleasure that I give you all of my opinions concerning the separate air service. Let me say that I have spoken frankly.

I believe, however, that I do not speak English well enough to appear before the Senate Committee on Military Affairs. I should, perhaps, have too much difficulty in finding adequate words and expressing my thoughts clearly.

I give you in the following pages my private opinions. At the end of the war I had something like 1,000 hours of flight, and I speak as an aviator; that is to say, as a man who has lived in a squadron from the beginning of the war to the end. I have faith in aviation, and I know that in the future the country which has not done all possible for the improvement of its aircraft and for the development of its air units will be unable to enter a possible war with the slightest chance of success.

Will you allow me to explain my ideas?

Yours, very sincerely,

DE LAVERGNE.

FRENCH AERONAUTICS AND THE PRIVATE IDEAS OF A FRENCH FLYER.

France perceived as soon as the war was ended the vital necessity to keep up a strong aviation. Undoubtedly the men who had seen during the war the tremendous number of hours of flight which were accomplished daily by the whole army believed that it was possible to consider seriously aviation as the best means of transportation for commercial use.

If I emphasize that, it is to show that this very truth was not and is still not well grounded in all minds.

Then all of the efforts have this purpose: To prepare the field of action for commercial aviation. There was one difficulty, however. The whole aviation was in the hands of military men, all of the planes were military planes, and there had to be a special process to make this aviation civilian.

If our country had suddenly suppressed its military aviation and cut down all of the credits, the plants would have shut their doors and commercial aviation would have been finished.

Everybody knows, indeed, that the setting out of aviation manufactures is a question of months and perhaps of a year. The aim was then to maintain at all costs the aviation plants. Truly it was not difficult; some men who were at the head of the aircraft industry, having the same thought, made up their minds to lose, perhaps, a little money at first, with the certainty of earning it back in the future.

The main idea of Gen. Duval was to keep a strong aviation. If I refer to the statement of Mr. Keys before Congress, he has called Gen. Duval a military man, dyed in the wool. But this clever military man has perceived immediately that if you leave the aviation in the narrow sphere of the Army or the Navy, aviation will come rapidly to tis death.

Gen. Duval then elaborated his program. One thing chiefly struck him and all of the fliers; it was that sort of rivalry which exists in all of the countries between the army and the navy. As a matter of fact, each of them, mewed up in their own office, worked apart at the same affairs.

Their technical divisions were closed to one another, and they had, however, the same field of action. During the war it was possible to see the Navy offering higher prices for an engine than the Army did. It was always this bad concurrence of competition which made them work just in the reverse as they should have.

Gen. Duval, considering, moreover, that in peace time the needs of the Army and Navy as to aviation were too small to maintain an aircraft industry, centralized the technical sections and the aircraft-production section of both of these ministries immediately.

This improvement is the main point of our new organization. It is stated in the official decree that the military aeronautics and naval aeronautics are independent and separated concerning the employment of their own units for tactical and strategical purposes, but they are compelled to meet one another in the technical section of the new organization, the name of which is, in French, "Organe de Coordination generale de l'Aeronautique."

DECREE.

Aircraft has, during the war, taken a great importance. We ought now to adapt it to the no less important part which it has in peace time.

But because of the multiplicity of the initiatives which are cooperating with its development and with its new use, the efforts and the means are scattered in several departments.

Now the future of aeronautics in France is secured only by the coordination of all of the efforts and the centralization of all general services.

Moreover, it will gain the advantage of having a better production as to the personnel and the appropriations which are actually assigned to the same purposes in different departments.

For that purpose there is created an "Organ de Coordination generale de l'Aeronautique." (Abbreviation: O. C. G. Ae.)

1. There has been constituted an "Organe de Coordination Generale," attached temporarily to the war ministry. It is in charge of:

(*a*) The study, the realization, fabrication, acceptation, delivery, and of the repair, concerning all matériel of aeronautics.

(*b*) A settlement in France, colonies, protectorates, of a system of a means of aerial communication.

(*c*) The centralization and the study of all the legislation, administration, and technical questions concerning the development of aerial navigation.

(*d*) The control of aerial navigation.

(*e*) To prepare the mobilization of the aircraft industry and to maintain this industry in peace time.

2. The technical service of aeronautics. The aircraft production bureau, the aerial navigation office, and the air attachés in the foreign countries are under the director of O. C. G. Ae.

The technical service and the fabrication service of O. C. G. Ae. will be an immense laboratory, studying all of the questions concerning military, naval, and civilian aeronautics.

THE CIVILIAN AVIATION.

You will see that in reading this decree the main purpose of it is to set out the civilian aeronautics. Almost nothing is said concerning the naval and military avaiation, but particularly about civilian aeronautics.

A general program of civilian aeronautics has been elaborated by Col. Sacconney, who is the director of the aerial navigation at the Organe de Coordination Generale.

Col. Sacconney saw immediately that the creation of an aerial navigation in France depended upon the creation of the fields, hangars, etc. He chose, at first, the largest towns in France and projected to connect them to Paris by air.

The line Paris-Lille was experimented on in February; then it was run by the Breguet Civilian Co., and now it extends to Brussels.

The line Paris-Bordeaux, which has been experimenting for the past three months, is going to become a civilian line.

Paris-Strasbourg has given very interesting information concerning the flight in the darkness, and this experience was successfully performed every night in May from Paris to Mulhouse.

By this time Farman, with his Goliath, has organized a weekly service from Paris to Brussels.

But it was not enough to settle fields and hangars. There was the question of helping the civilian companies.

In fact, many civilian companies at the end of the war had been constituted, and it was impossible for them to live by their own money. The duty of the State was to take on its charge not only the expenses of the fields and hangars, but also to sell at a very low price the military planes which were able to be transformed into civilian planes.

This was done. Even some companies which did not have money enough received their planes without paying anything, and some agreed with the State to share the benefits. It is so that the Latecoere Co., which has undertaken to work the aerial line Toulouse-Madrid-Rabat, in Morocco, has received much money from the aerial navigation office. This line functions successfully since two weeks, and the time gained on the train and the steamship is of four days.

One of these companies is very interesting. At the head of it is a very good engineer, who had a splendid situation in civilian industry. He left it to consecrate himself to civilian aviation. His purpose is to utilize the planes and the aerial photography in their countless varietes. He was given 20 airplanes by the French Government, for he had too small a capital. After very painful efforts he is now out of his difficulty, and he is earning much money. He is going to make the land register book in many districts. He takes pictures for the illustrated magazines for the owners of the manufactures, and he has a special bureau of drawing for the maps and the plans.

Moreover, he carries passengers, and he writes to me to-day that in two days he has carried 30 passengers from Deauville (the fashionable bathing resort) to Paris, at the price of $100 per person.

CIVILIAN AVIATION AS A RESERVE OF MILITARY AVIATION.

It is quite obvious that the fact of keeping a very strong military aviation would cause a tremendous expense, and a nation could not support it. Now, all the French aviation is going to become civilian. Yesterday it was entirely military, to-day and to-morrow it will be practically civilian. In case of emergency it will become military again. This system is certainly the best. Here are the intentions of the French Government:

1. Each civilian company will receive for each pilot the sum of 1,000 francs monthly, provided that these pilots give the proof that they have flown a certain number of hours. The case of the bad season has been noted.

2. The planes belonging to the companies may be paid in part (a quarter of the whole price) by the Government, provided that those planes be accepted by the aerial navigation office, and considered as available planes, in case of war. After some time the companies will have to change their planes and to adopt new types. In case of war all of these airplanes fall into the hands of the Army.

With that system we are sure to have thousands of pilots already trained. The time of the special training for the war will be reduced to a minimum. We are sure, too, of having many and many planes in case of war, and chiefly of having our plants open and working continuously.

We know indeed that it is impossible to make an aircraft industry come out of the ground by a magic switch.

THE QUESTION OF THE SEPARATE AIR SERVICE.

I am a military man, and I do not believe that it is good to take the whole aviation out of the Army. As a matter of fact, the military aviation has special men, special planes, and a special armament. If the Army can not control them and train them in liaison with the other arms, you would have in the next war very good pilots perhaps, but no military pilots. I am speaking now of the auxiliary aviation, that is to say, the aviation of observation, photography, reconnoissance, etc.

If a separate air service is constituted in your country, you will be obliged to detach in the military and naval departments all the auxiliary aviation that they want for their domestic use. The liaison between aeronautics and the troops must be so strict and so continuous that it will be of danger to do otherwise.

THE INDEPENDENT AIR FORCE.

But if this auxiliary aviation must remain inside of the Army or Navy, there is another aviation. And this very important fact has escaped the sight of many men. We, who have flown among formations of 250 planes, who saw the people on the ground fly away before us; we who know that it is possible to drop down 6,000 bombs in 10 minutes upon a given point; we know that, in the future, the effects of the aviation in mass will be terrific.

I remember the last day of the war, when we flew over the German troops in retreat, at an altitude of a thousand feet. There were 220 of us carrying 30 bombs of 20 pounds each and three machine guns. It was terrible to see the scene on the ground.

One day I said to Gen. Duval, upon returning from action, that the bombs we had dropped represented the fire of all the guns of an army corps during five minutes and at 12 kilometers into the lines. (This was impossible for the guns.)

If I give that example, it is to emphasize the terrific power of the aviation, and it was only the beginning.

In the future, powerful squadrons will fight in the air like the Navy on the sea. And these powerful squadrons will be the Navy of the air, if I am allowed to use such a neologism.

This aviation will be an arm, absolutely separated from the Army or Navy aeronautics. As it seems to me that this aircraft is quite bound to the civilian aeronautics, it will be under the air minister.

It was said that the aeronautics has not won the war. Certainly it did not. But it does not mean that in the future the aviation will not be the decisive factor of the victory.

I take a striking example.

Suppose that a country has not its own independent aviation and this country is attacked by an enemy who has one.

Suppose that the first days of the war you may see on your central station two or three thousand planes carrying each a bomb of 2,000 pounds, several tubes of asphyxiating compressed gas and powdered phosphorous, which is set on fire two or three days after it has been dropped. Do you think that this country would be able to resist to mobilize its Army, and to send it to the borders, if it has only its observation planes to repulse the others? Certainly not!

The first battle of the next war will be in the fourth dimension, and it will decide the destiny of the countries.

It is for that reason that I am in favor of an air ministry, who alone is able to handle such a task; that is to say, to establish:

1. A civilian aviation.
2. An independent aviation.

SOME DIFFICULTIES ENCOUNTERED.

But there is a difficulty in having an independent aviation. It is in the question of the personnel. Certainly I admit that it will be easy to recruit all of the pilots you want. But after seven or eight years you will have in the new arm many officers who will be unable to fly, and the high ranks of this arm will be held by officers who will no longer have the necessary fitness. To illustrate: I see very well the entrance of the house, but you will not have the way out. You have to find the means to ventilate, as we say in France.

A good system would be to recruit only the very strongest men as to heart and nervous system. Then in a short time, when they had rendered good services and obtained a high rank, they would be retired with very good pay.

I have spoken about the pilots who do not have special qualities of intelligence. As to the distinguished officers, they should be kept carefully, even if they are not able to fly, to compose the staff of aviation.

In all cases it is necessary to have promotions by selection, a system which alone will give aviation the very youngest officers and chiefs which it needs.

This latter reason is again an argument in favor of the separate Air Service.

Capt. DE LAVERGNE, *French Air Attaché.*

SEPTEMBER 23, 1919.

SEPTEMBER 11, 1919.

MY DEAR COMMODORE CHARLTON: The Military Affairs Committee of the United States Senate is holding hearings on my bill, which proposes to create a department of aeronautics in the United States similar to that which your country now has in operation.

There has been a considerable diversity of opinion in the various statements I have read as to the success and general satisfaction of the separate air ministry in England, and I believe the only way to have this matter settled is to ask some one who has seen the air ministry in actual operation and has served as a part of it. For this reason I am taking the liberty of asking you to give me your ideas, at your convenience, on the following questions:

1. Do you consider that in a future war aviation will hold a greater or a less predominance than in the past one?
2. In what manner does what you have just related bear on the subject of an independent air service?
3. Do you expect that nations will submit readily to the expenditure needful to maintain, on a necessary scale for immediate use, a strategic force of the size and nature you imply?
4. Was not the independent nature of the air force on the western front a constant source of friction as between the air-force commander and the army commander?
5. How do you answer the objection that pilots of army machines and navy machines must be fully trained in the methods of the army and the navy, and must accordingly, for the efficiency of that training, belong part and parcel to those services?
6. It is being constantly reiterated that the separation of the air force in England has been so little successful that in all probability the Royal Air Force will, before long, be split up again into the several services and branches. Is there foundation for this statement?
7. Is it not a fact that at the present time the Admiralty are nedeavoring to separate to themselves the branch of naval aeronautics?

Yours, very sincerely,

HARRY S. NEW.

Air Commodore L. E. O. CHARLTON,
British Air Attaché, Building D, Sixth and B Streets.

Following is the reply received to the letter sent by Senator New to Commodore Charlton:

SEPTEMBER 22, 1919.

"1. Do you consider that in a future war aviation will hold a greater or a less predominance than in the past one?"

There can be no doubt that in any future war the predominance of aeronautics will be supreme both at the commencement and throughout. In the war which is just over both naval and military aeronautics grew up with the expanded Army and Navy as domestic adjuncts to them both, and the service it performed was auxiliary to the other arms, and having for its sole object the advancement of the other arms and nothing else.

In the later stages of the war aviation utilized more and more whatever surplus energy it possessed for independent action against the enemy on the ground, and fighting in the air became, in its turn, almost a separate incident from the other methods of war. In all this, however, the action of the aerial arm was seldom strategic; not, in fact, until the creation of the independent air force did the aeroplane as a strategic arm come into existence, and the significance of this, though not stressed at the moment, is very apparent.

The independent air force, together with the efforts which were being made to bombard the enemy's capital from the English coast, seemed to connote on the part of the aerial arm a new function and importance, outweighing by far its former domestic purposes. This function being neither more nor less than the paralysis of the enemy's nerve centers and communications before or during the mobilization period in the case of a future war.

The domestic service auxiliary to the other arms will always be required and will always be developed, but over and above them, and first in importance, comes the strategic use of the aerial arm at the earliest sign of an inevitable outbreak of hostilities.

"2. In what manner does what you have just related bear on the subject of an independent air service?"

By what I have said, I have inferred that the supreme use of the aerial arm of the future is a strategic one at the commencement of war, and it seems patent that the strategic use of this arm can not be developed supremely unless it has an independent existence which will, without hindrance or interference from other services, permit of its full development. In plain words, if the strategical use of the aerial arm is of more importance at the commencement of war than its use as a domestic adjunct, then the air force as an independent service is a necessity.

"3. Do you expect that nations will submit readily to the expenditure needful to maintain, on a necessary scale for immediate use, a strategic force of the size and nature you imply?"

No; I do not think so, and that brings me to a point which, I think, dispassionately provides the final argument in favor of an independent air service. Granted that the use of aeronautics in future wars will be greater, and not less than in the wars of the past; granted that its use as a strategic arm at the very commencement will be of supreme importance, how then is it feasible, without an expenditure which will lay an impossible burden on the country, that the full force of this arm in its strategic sense be provided in due time? The answer, to my mind, lies with the machines in use for civil and commercial aeronautics; that, just as much as in time of war the Navy expands by pressing into its service all sorts of mercantile ships, so will the aerial arm expand by pressing into its service all sorts of civil and commercial airships, and that the first line of aerial reserve will be provided by these means.

Unless what I have said is altogether wrong, the airships in use by civil and commercial aeronautics are the lifeblood of aerial supremacy; but, without an independent air service having as one of its branches a bureau for civil and a bureau for commercial aeronautics, how can those interested in civil and commercial flying be depended upon and encouraged to develop their enterprises on the lines of the necessities of defense. Without central control, such items as the airworthiness of machines, the efficiency of instruments, the competency of pilots, etc., would be of so widely divergent a nature and so incomglomerate a whole as to be of little or no use at the very moment it was required, viz, at the moment of hostilities.

"4. Was not the independent nature of the air force on the western front a constant source of friction as between the air force commander and the Army commander?"

No; there was never to my knowledge a single occasion of friction. The staff of the air force and the general staff of general headquarters had drawn up, in conjunction, a working method which answered perfectly. Briefly, it was for the military commander to demand his requirements from the air force commander, and it was the responsibility of the air force commander that he should comply fully with these demands. Let me take two instances, explaining this situation by simile:

(1) An attack is planned in which a certain number of divisions are due to go over the top at dawn toward limited objectives. At the conference beforehand, the air force commander is present and takes part in the discussions; as a result, the requirements of the military commander are made known to him, and they discuss in unison the possibility or feasibility of carrying them out. Any objections which exist are stated then and there and disposed of one way or the other. On the day of attack, the cooperation of the air force is assured to the full extent expected, and neither less nor more.

(2) During a quiet phase the enemy on a special sector of the front suddenly developed air tactics, including the bombing of Army headquarters. The military commander, of a somewhat excitable disposition, rings up the air force commander, asks him what he is doing to permit such a state of affairs, and orders every machine into the air at once. The air force commander, realizing the ruination which would immediately follow such a plan of action, and that on the chance of doing a very little good he would place his whole force out of action for a considerable period, in his discretion respectfully points out to the military commander the drawbacks of carrying out his direction. Discussion ensues, the military commander is pressed, agrees, and is further educated in the use of the aerial arm, and so on.

"5. How do you answer the objection that pilots of Army machines and Navy machines must be fully trained in the methods of the Army and the Navy and must accordingly, for the efficiency of that training, belong part and parcel to those services?"

My answer is that the whole question is one of training only, and that the methods of cooperation between the aeroplane and Army and Navy units are largely of a similar description and differ not in principle but in practice. The method of fighting in the air is the same in principle, the method of artillery observation is the same in principle, the method of reconnaissance is the same in principle, and I do not think there is a wider difference between an Air Service pilot operating with the Army and an Air Service pilot operating with the Navy than there is between a pursuit pilot and an artillery observation pilot or between a night bombing pilot and a day bombing pilot, or between a pilot trained to take oblique photographs and a pilot trained to burn enemy balloons. In other words, it is my opinion that divergencies in training exist between two natures of pilot operating with the Army greater than exist between an Air Service pilot operating with the Army and an Air Service pilot operating with the Navy on similar work, either of fighting, bombing, photographing, or observing for artillery. If one training system can produce efficiently pursuit pilots and artillery observation pilots, then one training can equally well or better produce pilots to observe artillery for the Army or for the Navy, pilots to bomb enemy ships or enemy dumps, pilots to fight over land or over sea, pilots to reconnoiter fleet formations or land formations, and incidentally, the expense of dualism and duplication in training and experimental establishments will be halved.

"6. It is being constantly reiterated that the separation of the air force in England has been so little successful that in all probability the Royal Air Force will, before long, be split up again into the several services and branches."

I can assure you that there is no ground whatever for such a statement and that, on the contrary, the amalgamation has proved a decided success and that only recently, in order to mark finally the complete separation of the Royal Air Force from the navy and the army new titles of rank have been approved by the King. Certain reorganizations are taking place, as is inevitable in an undertaking so large as the separation of service aeronautics from the other services, brought about hastily during a period of war; but these reorganizations serve only to emphasize and mark the fact of final separation, rather than a revision to the old order of things.

"7. Is it not a fact that at the present time the admiralty are endeavoring to separate to themselves the branch of naval aeronautics?"

There has always existed a strong reactionary tendency on the part of a strong section of senior naval officers. At the time of the amalgamation itself the fact that this opposition was not strongly developed is due probably, in chief, to the urgency of the occasion, which compelled all those connected with the unification, be they soldiers, flying men, parliamentarian or political leaders, to proceed with the utmost speed in a legislative sense.

At the same time the needs of the Navy as regards aeronautics are undoubtedly peculiar and are, as such, being more and more recognized. The questions of discipline and morale are intimately bound up with the status of individuals on board ship, and this alone occasions special provision.

I think I can best describe the action which is pending to meet this need as a case of "seconding" "en bloc" to the Navy such personnel as she requires for her special aeronautical necessities and endeavoring as far as possible to insure that the greater part of this personnel should be men of seafaring experience under a naval training system.

But all this and all questions akin to this have, to my mind, no bearing whatever on the general question of a unified air service, and to fail to realize this is simply to confuse issues. The domestic needs of the services in aircraft cooperation are cut and dried, and although development will inevitably take place, it will take place on cut and dried lines and can be reasonably foreseen because the utilization of the aerial arm in service cooperation of aircraft can not be divorced from the utilization of the other arms of the Navy and Army.

These domestic duties are details in the general great scheme of national aeronautics, with all that it implies in the way of experiment, development, production, supply, and research in order to foster it in a broad and general sense on the right path, and so that it will minister to the national needs of defense and offense, and mercantile development, and not remain compartmented in a water-tight sense in any one service or in any two services.

(Thereupon the subcommittee adjourned to meet Monday, Dec. 15, 1919, at 10.30 o'clock a. m.)

UNITED AIR SERVICE.

COMMITTEE ON MILITARY AFFAIRS,
SUBCOMMITTEE ON AVIATION,
HOUSE OF REPRESENTATIVES,
Tuesday, February 3, 1920.

The subcommittee met at 3 o'clock p. m., Hon. W. Frank James (chairman) presiding.

(The following letter is submitted for the record:)

WAR DEPARTMENT,
Washington, February 17, 1920.

Hon. W. FRANK JAMES,
Chairman Aviation Subcommittee, Committee on Military Affairs, House of Representatives.

MY DEAR MR. JAMES: While I was before the Committee on Military Affairs on the 4th instant, for the purpose of discussing another matter, you asked me to discuss the appropriation of $15,000,000, in round numbers, carried by H. R. 11809, for aircraft, now being considered by your subcommittee. At the time mentioned I did not have with me in detail the data pertaining to this proposed appropriation, nor was I able at the moment to recall all the pertinent facts in connection therewith, as fully five months had elapsed since I appeared before the Senate Military Committee and urged the pressing necessity for making this appropriation at that time.

In the discussion of this matter on the 4th instant, a member of the House Military Committee expressed himself as being of the belief that some responsible representative of the Air Service had stated to the committee that a considerable portion of the current appropriation for the Air Service would be used for the purchase of new airplanes. I have since had an opportunity to investigate this matter and find that no one of the Air Service in authority, representing the War Department, had knowingly given the committee reason to believe that a portion of the appropriation for the Air Service would or could be used for the purchase of airplanes. A thorough search of the recorded testimony before the House Military Committee fails to show any statement which could be so construed. In fact, the amount of the current appropriation for the Air Service is more than $5,000,000 less than the estimated requirements for the usual running expenses of the Air Service, as submitted to Congress for the fiscal year 1920, not including the purchase of any new aircraft for equipment of squadrons.

A few sample planes, not more than three of any one kind, have been purchased for experimental purposes, which include destruction tests for determination of strength and safety factors.

The Director of Air Service, Maj. Gen. C. T. Menoher, has submitted to you a statement showing the necessary expenditures from the current appropriation for the Air Service and the impracticability of purchasing new airplanes from this appropriation.

In particular, I wish to state for your consideration, as I did state to the Committee on Military Affairs of the Senate, that I regard the necessity for the appropriation of this $15,000,000 for the purchase of aircraft to be decidedly of an emergency nature which can not well wait for the regular annual appropriation act. This emergency lies largely in the fact that within a year all airplanes now on hand will have become unsafe to fly through deterioration, due to age and the severe exposure, incident to the shipment

of a large number of these planes to Europe and return. It has been found that two years may be assumed as the limit of safety life of an airplane under normal conditions. Within a year all airplanes on hand will be over two years old and some nearly three years old. It will require fully a year to produce the planes which it is proposed to build with the funds carried by H. R. 11809 now before your subcommittee. It, therefore, follows that if orders be not placed for new planes at once, there will be a time during the year 1921 when the Air Service will have no planes safe to fly; hence the urgency with which I present this matter for your early consideration. The period of five months and more which has elapsed since I first presented this matter for consideration by Congress has measurably increased the necessity for an immediate appropriation.

Very respectfully,

NEWTON D. BAKER,
Secretary of War.

STATEMENT OF MAJ. GEN. CHARLES T. MENOHER, DIRECTOR OF AIR SERVICE.

Mr. JAMES. General, you are familiar with H. R. 12134, introduced by Mr. Hull?

Gen. MENOHER. Generally; yes, sir.

Mr. JAMES. Suppose we take up that bill section by section.

Gen. MENOHER. Yes, sir.

Mr. JAMES. That is somewhat similar to H. R. 9804, introduced by Mr. Curry, the first section of it?

Gen. MENOHER. Yes, sir. I think the preamble, the introductory clause, is similar. There is a similarity among all those bills in that respect.

Mr. JAMES. What I mean is the first section.

Gen. MENOHER. I have not the Curry bill with me. Well, there is a considerable variance there.

Mr. HULL. There is quite a striking difference between the two bills there.

Gen. MENOHER. A very marked difference. The Curry bill provides for a United States air force and for an air reserve force for the development of civil and commercial aviation. There is no reference to commercial aviation in the Hull bill.

Mr. JAMES. I mean the first paragraph, not the title, where is says:

> That there be, and there hereby is, created and established at the seat of Government, a department of aeronautics.

Mr. HULL. I think you will find this difference, Mr. James, between most of the bills and my bill. My bill provides that:

> The provisions of title 4 of the Revised Statutes, including all amendments thereto, be, and hereby are, made applicable to said department.

Of course, that is rather a technical proposition. I do not know whether you favor a separate Cabinet officer, General, do you?

Gen. MENOHER. No, sir; I do not. I would like to state, if I may, in a general way just what I stand for in this general proposition of organization of the Air Service, and then we can take up the question of wherein I differ from Mr. Hull in his bill. There are three fundamentals for which I have been contending.

One is that the Army, and the Navy also, should retain its personnel and its organization as an integral part of the Army, or the Navy, as the case may be; that the flying officer shall be an officer of the Army. The Navy is contending for the same thing very

strongly. I have explained this previously in this room to the full committee as to just how I stand on that.

Mr. JAMES. Would the same thing apply to the Post Office Department?

Gen. MENOHER. That is something that I have not considered. I have not gone into it as to the needs of the Post Office Department, because their need is different from ours. I leave that for the determination of superior authority to mine. I will deal with that with which I am immediately concerned. It is unthinkable to me that the air force that operates with the Army should not be a part of the Army.

The second contention that I make is, and I consider this vital also, that each of the departments of the Army and of the Navy, and if the Post Office Department is included in the same category, it also, but I speak particularly for the Army—that the Army should determine the types to be provided to suit their needs. In other words, each service should carry on its own experimental development to the point of production and that then, and only then, should the production department take over the matter of production. Now, a plane is a plane, but a plane as delivered from a manufacturer, ordinarily, and especially in this case delivered from a civilian manufacturer who did not understand the specific needs of the Army, a plane turned over by them would not be a fighting plane any more than a soldier who had not been given a uniform or arms would be a fighting man. There are a thousand and one things in a complete plane ready for service that can only be determined by the activity that uses it, the Army or the Navy. The armament, the radio, the armor that it should carry, the signals, the photographic apparatus, and all those things have to be determined by the Army, and the two have to be built mutually around each other; that is, the equipment and the plane itself have to be built around each other. Space is exceedingly limited. Then again the function will have to be determined by the service that is going to use the plane. So I maintain that the Army, speaking for the Army now, should determine the type of plane, should carry on its own experimental development up to the point of productio.

The third contention is that we should have an agency for production which would take over the matter of production when the design that was desirable for a particular service was ready, to take that over and produce it; that this agency should also be charged with handling civil aeronautics. Now, by that I mean the aeronautics that are necessary in carrying on the functions of the various departments of the Government. I have in mind particularly the forest patrol of which we did a great deal last summer. I believe that this civilian agency should carry on that work, that it should also be charged with the preparation of rules and regulations for the navigation of the air, the licensing of pilots, the inspection of aircraft for commercial and other purposes, and I am inclined to think that it should operate planes for this civil work, and, too, that it should take over the forest patrol, although we stand ready now to continue the work that we have been doing last summer and carry it on in the future as we have in the past, just in case of an emergency. That is the only legitimate and proper use of aviation by the Army for that

purpose that I can see. So that those are the three things that I contend for: The personnel of the Air Service of the Army to remain integrally a part of the Army; that the Army should carry on its own experimental development up to the point of porduction; that there should be a production agency which should be charged with the production and that it should handle the civil work of the Government. Now, Mr. Hull's bill agrees with that, in that it leaves the aviation that will operate with the Army, the Army aviation, where it is. That is not referred to in the bill in any way, so that it meets with my approval in that respect.

Mr. CALDWELL. Mr. Hull disagrees with you on that, does he?

Gen. MENOHER. I think there is no reference made in this, bill to that point.

Mr. HULL. There is no intention at all to have anything to do with the operation. You are absolutely right on that proposition.

Gen. MENOHER. That is what I thought.

Mr. HULL. I might say briefly that this bill, if it does what I think it does, and I think it is correctly drawn, would take over, under a director or a bureau or an executive department, the engineering of the Navy and the Army—and there is probably where you would disagree with this bill—and consolidate them all with the civil, so far as production goes; then turning over the planes to the Army to let them operate and to the Navy and to the civil. The only difference I can see from your idea, if I catch your idea, is that this goes a little too far in engineering.

Gen. MENOHER. In design; yes, sir.

Mr. HULL. But I rather imagine you have the wrong idea of the bill.

Gen. MENOHER. Section 3 of the bill, on page 3, it is provided:

> That the director of aeronautics be, and he hereby is, vested with complete and exclusive jurisdiction and cotrol over the production, procurement, purchase, manufacture, designing, and development of aircraft.

Now, if those two words were left out, "designing and development," it would agree with me.

Mr. HULL. My idea is this, that when this board is composed of four men, a director who unquestionably will be in harmony with the general idea, and a Navy man and an Army man, that they will control the whole matter. I can not see the object myself of creating a new department unless that department would have control of the procurement of the machines. Now, if it is going to control the procurement it must cotnrol the entire matter. There is no intention, however, in the bill that they should be arbitrary at all, because the bill is expressly drawn so that you would have an Army man there who would take care of that branch for the Army, and the Navy would have a man on that board and he unquestionably would take care of the Navy. I can not imagine that there would be any difficulty in harmonizing between this board and the Army.

Gen. MENOHER. It does not depend so much on the personnel.

Mr. HULL. It would depend on the man they brought in and whether the Army would try to cooperate with him. I can not imagine that there would be any trouble along that line in this bill at all. That is the first time the suggestion has been made. I never heard the idea that we should create a bureau here just merely to

procure these machines. So far as regards the engineering, the designing of machines for the Army and the Navy and the civil, to a large extent but not altogether the same general principles prevail all along. If you are going to have a department that is going to save us money that department must control; somebody must control, and this bill is drawn with that idea, that in the procurement up to that point this board would control, but it would be in absolute harmony with the Army and the Navy.

Gen. MENOHER. I do not think the bill provides the machinery for the wielding by the Army or the Navy of the influence that is going to be required to carry out the ideas and wishes and needs of the Army. There is one officer provided for that purpose, without the necessary machinery, I take it, for carrying on his work.

Mr. HULL. Unquestionably, if you had designs this board would be glad to have them, and they have the power to give you all the personnel. This board can allocate back to you anything that you want.

Gen. MENOHER. It does not allow the allocation of anything except the one man who becomes nothing more than a liaison officer. No one man could possibly do all that will be required of this Army or Navy representative. He must have with him a staff of trained officers who can present the exact and relative value of military as well as technical considerations for the action to be taken on almost every question calls for a compromised solution. The science of design and use of aircraft is not an exact one. This compromise is not a thing for occasional consideration but is ever present in every phase of the activities charged to the department of aeronautics. Time of production, cost and degree of serviceability or perfection must be constantly weighed against each other by experts qualified to know the relative values of each in its application to the needs of the military program. At times these decisions must be made during the stress of war. It is here where the Bureau of Aircraft Production found its greatest difficulty during the late war. This difficulty can be easily obviated by giving the Army representative such assistants from the Army as he may need. In general, the same conditions apply for the representative of the Navy. The assignment of fields and facilities also are essentially matters of military training and operations on which the Army representative will need the assistance of other officers from the Army Air Service.

Gen. MENOHER. But he can not allocate the other way In other words, he can not allocate personnel that I consider necessary from the Army to assist him in carrying on his work.

Mr. HULL. Certainly. If you are willing to give him some of your personnel and he wants to cooperate with you, you can do it under this bill.

Gen. MENOHER. As I take it, the bill specifically charges the director with the designing.

Mr. HULL. Yes, sir.

Gen. MENOHER. It absolutely takes it away from the Army and it also takes away the development.

Mr. HULL It gives him the authority to do so and unquestionably he would have the authority under this bill, and if he wants to work, which he should and would unquestionably, with the Army,

you have a set of designers working and the money appropriated for that purpose, certainly he would be glad to cooperate.

Gen. MENOHER. Well, that might be so.

Mr. HULL. Well, it would be so.

Gen. MENOHER. It seems to me that according to the terms of the bill the director would feel compelled to take up that part of the work, the designing and development, to the exclusion of the needs of the Army or the Navy if he saw fit.

Mr. JAMES. Unless there was a proviso, according to line 12, it seems to me that the director of aeronautics would be vested with complete jurisdiction over designing.

Mr. HULL. Sure.

Gen. MENOHER. That is just what I do not want to see done. I want the Army to have jurisdiction over the design.

Mr. JAMES. Your idea is that the Army should design their own planes and the Navy should design their own planes, and after that has been agreed upon then the director of aeronautics should go ahead and take care of production.

Gen. MENOHER. They would make requests upon the director for so many planes according to this design that we have worked out and that we consider is sufficient and practicable for our particular needs.

Mr. JAMES. Your idea is that no planes should be manufactured unless the design for the same has been approved by you as the head of the Air Service?

Gen. MENOHER. Exactly, and tested out by our experts. The matter of test must be left to the experts who are going to use the planes.

Mr. HULL. Of course, that is my idea, that the Army would always have the test or would probably unquestionably design, but if we are going to consolidate at all and save this Government any money we must place the authority in the head of that bureau to procure, and if he is going to procure he must have the final authority as to what he is going to procure. Now, I do not imagine that undr this bill there would be the slightest bit of trouble with the Army getting the kind of planes it wants.

Gen. MENOHER. There certainly would be, Mr. Hull, if the Army did not have the authority to say what they needed.

Mr. HULL. I can not see why they would not. There would be an Army man on this board and there would be a Navy man, and they would control.

Gen. MENOHER. They can not control without authority, and I do not see that there is any authority given in the bill for any control.

Mr. HULL. Then your attitude is this, that you do not want anyone to operate at all, and you do not want anyone to design or have anything at all to do with the engineering of the planes; all you want to do is to create another bureau simply to procure?

Gen. MENOHER. To procure and to handle the civil aviation of the country and to operate to a certain extent in the civil affairs.

Mr. JAMES. Your idea is that they would be manufacturers?

Gen. MENOHER. They would really manufacture or procure. There is another thing: Apparently by the terms of the bill, although

I am not entirely too clear on that, I am not quite clear in my mind, it is apparently intended that the Government shall take over the manufacture of the planes. The authority, I think, is given——

Mr. HULL (interposing). The authority is given to the director.

Mr. JAMES. In section 4.

Gen. MENOHER. Under section 4 the director of aeronautics is authorized and directed to build, purchase, procure, and set up factories, buildings, and machinery of whatever kind and nature for the manufacture and production of aircraft, aircraft parts, and any equipment pertaining to the manufacture and production of aircraft; to purchase growing timber and timberlands producing aircraft material, etc. I am not certain that that does or does not contemplate that the Government should go into the matter of production.

Mr. HULL. I will tell you what that contemplates. That contemplates just the same as the other provision, that this board, this new department, would investigate thoroughly, with full authority to do whatever was best. They would have time to investigate and certainly the Army would be in harmony with them, because a member of the board is from the Army and a member of the board is from the Navy, and they would decide that very vexed question much better than a committee of Congress could decide or than the Army could decide, or anyone else, because they would be given authority to investigate and find out what was best to be done. That is what I think you have to do if you are going to get anywhere on this aeroplane proposition; that is, to give some one authority to investigate and find out. Now, if this bill goes too far, it is easily trimmed down, if they can not harmonize.

Gen. MENOHER. It strikes me that a live director of aeronautics might easily interpret that provision as directing him to take up the manufacture of planes for the Government to the exclusion of private manufacture of them.

Mr. HULL. If he saw fit, certainly he would have that authority.

Gen. MENOHER. It seems to me it is necessary to put down some provision in the bill, that there should be some saving clause in there which would contemplate the allocation, under proper regulations, after calling for bids in the usual manner of the production to civil or commercial firms.

Mr. HULL. That is just the point that I wanted to avoid, General. I did not want to tie the hands of the director at all, or his board. I want them to have full authority to investigate that very vexed question. I do not know, but I really believe that practically all Congress wants that question investigated very thoroughly.

Gen. MENOHER. I am perfectly willing to let that question go as it is, whether it is more economic for the Government to manufacture or whether or not it produces a better product than the commercial firms. It seems to me that, as a matter of national defense, as I explained yesterday, we must do what is reasonable to maintain and foster a nucleus, at least, of commercial aviation, of manufacture, because we are liable to run against the same thing as we did at the beginning of this war, go into the war with no civil industry to fall back upon and everything have to be built up from

the very ground. Therefore, I, as an officer of the Army charged in a measure with the national defense, feel that that responsibility is mine, that I should do everything to make the greatest measure of defense that is possible with the appropriations provided.

Mr. HULL. Of course, you understand where I stand on that proposition. I have a different idea of that from your idea. I think a great many Members of Congress have the same idea. I am perfectly willing to throw up my hands and say that I do not know. This question is one of the biggest questions I think that confronts Congress to-day. I think that if you are going to create a department at all, that you ought to give the head of that department authority to decide that question, and that is all there is to it.

Gen. MENOHER. As I attempted to say, I do not think it makes much difference for this particular purpose. I believe that even if Government manufacture does cost less, and does perhaps produce superior articles—if it does, I say—just the same, we should build up commercial production as far as practicable and reasonable.

Mr. HULL. You admit that that matter is wholly up to this department of aeronautics?

Mr. JAMES. I do not think section 3 would allow the director of aeronautics to allocate any part of the appropriation to any particular firm or firms.

Mr. HULL. Yes; you could purchase.

Mr. JAMES. The director could purchase, of course, but under the law would he not have to give these contracts by bids. Suppose we put in a proviso somewhat similar to the first paragraph we had yesterday in Mr. Kahn's bill, where you are allowed to allocate part of the work? Section 3 might be broad enough, but as I understand it, Gen. Menoher, you do not think section 3 is broad enough to allocate part of the work?

Gen. MENOHER. That might easily be cleared up by an elaboration or an enlargement of section 4, which gives recognition to the other side of the question, and that is, the allocation to commercial firms in the manner now common—after competitive bidding.

Mr. JAMES. Your idea is that there should be a proviso in section 3 along the line of the proviso in the Kahn bill that we considered yesterday?

Gen. MENOHER. The last section of that bill? No; I do not think so. I mean the allocation under the regular rules, customs, or laws, as they really are, by inviting bids and giving the contract to the lowest bidder. What I mean is that recognition is given here to the building, purchasing, procuring, and setting up of factories, buildings, and machinery of whatever kind and nature for the manufacture and production of aircraft and aircraft parts. In other words, it gives a very distinct recognition to the Government manufacture of aircraft and gives no recognition to the production by commercial firms.

Mr. JAMES. Well, it gives the director of aeronautics the authority to go out and purchase aircraft, but it would be subject to competitive bids, and your idea is that there should be a proviso whereby they should have competitive bidding, or where they could allocate the work if it were so desired?

Gen. MENOHER. No, sir. I am not standing out for the allocation arbitrarily in this bill, at all.

Mr. JAMES. But you think that if this bill is reported out, it should contain a proviso along the line of the proviso in the Kahn bill?

Gen. MENOHER. No, sir. That was only an emergency case; simply a provision recognizing the commercial industry in this matter; that for the purpose of fostering the industry, there should be some show given to the commercial industry.

Mr. JAMES. Would you have competitive bidding?

Gen. MENOHER. As a rule; yes, sir.

Mr. JAMES. Would you have any case where there would be allocation?

Gen. MENOHER. Only in an emergency, as I stated yesterday, when I considered it very desirable—but only for an emergency.

Mr. JAMES. If that is your understanding—that is, where you are going to give it to anybody who wishes to put in a bid—that is taken care of in section 3, because in section 3, line 13, the director of aeronautics is vested with complete and exclusive jurisdiction and control over the production, procurement, and purchase of aircraft. So that would mean—and I think that is the intent of Mr. Hull—that the director of aeronautics can go out and purchase, if he thinks it advisable; or if he thinks it advisable for the Government to go into the construction, he can so recommend to Congress and the Congress can so appropriate for that purpose.

Gen. MENOHER. If that is the purpose and the scope of the bill, well and good.

Mr. HULL. He has full control under that authority to take care of anything along that line.

Gen. MENOHER. My first contention is against the designing and development.

Mr. HULL. I do not know whether you catch my viewpoint or not, but I can not understand how under this bill there would be any conflict with the Army or the Navy in the designing of planes, unless a man was a fool and tried to do something that he should not do. Of course, we all have that unknown quantity that we call the human equation to contend with, and I imagine that whoever controls this matter the board working with him will work in entire harmony, and if he does he will have to work in entire harmony with the Army and the Navy.

Gen. MENOHER. If he were charged with the procurement of planes and material for the Army alone, or for the Army and Navy alone, there would be no civil or commercial side to it. That would be all right. But I am very fearful that a department of this kind, which is essentially civil, would get entirely out of touch and out of harmony with the particular and peculiar needs of the Army and Navy.

Mr. HULL. But you say it is entirely civil, and it is not.

Gen. MENOHER. I say it is partially civil.

Mr. HULL. You have to put the control somewhere. If you are going to do anything at all you will have to have control.

Gen. MENOHER. Control of production is very good, but not control of design and development to meet particular needs.

Mr. JAMES. Is this what you are afraid of? That the director of aeronautics might be a civilian, two of the assistant directors might be from the Navy and one from the Army?

Gen. MENOHER. Only one from the Navy, one from the Army, and one from civil life.

Mr. JAMES. Well, suppose these two men are agreed on a design for the plane that you think would not be all right for the Army, but might be all right for the Navy.

Gen. MENOHER. They might design a plane that might be not suitable for either the Army or the Navy. It seems to me fundamental that the service that is going to use the plane should be charged with the experimental development and design of that plane, so that when you reach the stage of production, when all the "bugs," as they call them, are eliminated, the plane is ready to be produced. When it is designed to meet the needs of the Army, then the board would take over the question of procurement.

Mr. HULL. But the Army, under this bill, has everything to do with operations. They are in absolute control finally, because if this bureau should deliver to the Army a plane that would not fly they could say to the bureau, "You are delivering planes that are not practicable," and then it would be up to this board to produce the planes that would be accetpable to the Army.

Gen. MENOHER. But they would have already produced planes.

Mr. HULL. They certainly would not have produced very many of them under those circumstances.

Mr. JAMES. Your objection is to the word "designing and" in line 13?

Gen. MENOHER. My objection is to the words "designing and development." I want the designing left to the Army up to the point of acceptance by the Army, and then, when it gets to the point of production, it can be turned over to the bureau for production.

Mr. JAMES. If the words "designing and" were eliminated, that would meet your objection?

Gen. MENOHER. No: the words "designing and development." Now, there is a provision in the Morin bill that comes more nearly meeting my idea, and it recognizes the civil part of it. This provision in the Morin bill charges the department of aeronautics with the conduct of all development work in regard to aeronautics except so far as it relates to the military and naval forces. That is what I am contending for.

Mr. HULL. Then, if you had an engineering school such as we have at Dayton, Ohio, this department would not have anything to do with that; that would be in charge of the Army?

Gen. MENOHER. Yes, sir. Now, that can be combined with the Navy, and it would be very desirable, in my opinion, that it should be combined with the Navy, and each should be permitted to carry on that part of the designing and development work that is intended for their particular needs. Now, there are certain things, certain tests that are common to both, that could be carried on very easily under a combination, and I would be in favor of a combination to prevent that duplication.

Mr. HULL. That is just what this bill does. Somebody would have to be in control at Dayton. You could not have the Navy in control, or the Army in control, so we have a separate bureau cooperating in harmony with both of them.

Gen. MENOHER. I am afraid of that harmony; very much.

Mr. JAMES. How about the latter part of section 4, to establish aerial landing fields, construct airdromes, and otherwise to equip said fields for use for such purposes? That is on lines 12, 13, and 14, on page 4.

Gen. MENOHER. That is all right. I have nothing to say to that.

Mr. HULL. There would not be any trouble with that provision.

Gen. MENOHER. No, sir.

Mr. JAMES. How about this provision?

To engage and employ such inventors, engineers, scientists, experts, special agents, and employees as are necessary to carry out the purposes of this act.

Gen. MENOHER. That is all right.

Mr. JAMES. How about lines 22, 23, 24, and 25?

To establish and promulgate rules and regulations governing navigation of the air, including the establishment of aerial routes for international, interstate, and intrastate flying.

Gen. MENOHER. That is something I have been fighting for ever since I have come to the air service, and I have not been able to get anything done. I consider it a crying need that we should have licensing of pilots, inspection of ships that go into the air, interstate rules for the navigation of the air, tying up of the international convention—that is a part of the peace treaty—I consider that a very, very crying need, and the place to put it is in the department of aeronautics.

Mr. JAMES. It seems to me that the difference between you and Mr. Hull on section 4 is that his idea is that the director should go to work and investigate and report to Congress and ask for an appropriation in case he wished to build and set up factories, and your idea is that he might go to work and do something without consulting Congress. Is that it?

Gen. MENOHER. No, sir. I am not afraid of that part of it. I am afraid of the civil agency getting out of touch and sympathy with the Army. I am afraid that giving such recognition to the manufacture by the Government would exclude the idea of manufacture by commercial firms.

Mr. JAMES. How about section 5, on page 5?

Gen. MENOHER. Subject to the other objection that I made, I do not see anything in that to object to.

Mr. JAMES. The same thing applies to section 6, on page 7, which provides that the director of aeronautics shall, upon the request of the Secretary of War, the Secretary of the Navy, the Postmaster General, or the head of any other executive department of the Government, be empowered and have the authority to turn over, transfer, and detail aircraft, aerial landing fields, completed aircraft parts, or such other property as he may deem necessary for the proper operation of such aircraft for use in, and for such department, etc.

Gen. MENOHER. Yes, sir.

Mr. JAMES. General, have you ever had the matter of a separate air service up with Gen. Pershing?

Gen. MENOHER. Yes, sir. When Gen. Pershing was here, before he started on his trip, I had quite a long talk with him in regard to a separate air service. At that time I left with him a copy of the report of the board of general officers, of which I was a member, that dealt

with this subject of a separate air service. He expressed to me some rather clear-cut ideas in regard to the separate air service. The following day, I think, he was before the joint committee for hearing, and then, I think, the following day he was up a second time. His remarks were quoted in the press of the country, and not quoted in the same way, as a rule, and it was evident to me that his attitude in the matter was not fully understood. Therefore, I wrote him a personal letter asking him if he would give me categorical answers to a number of questions that I would like to ask. He replied answering those question, and, I believe, copies of my letter and Gen. Pershing's reply to my letter have been furnished the members of the committee. Mr. Fisher made a request on me for a statement such as I am making now and I replied by furnishing him with a copy of these two letters, and, if it meets with the approval of the committee, I should like to have those two letters go in the record as a part of my hearing.

Mr. JAMES. You want this letter that you sent yesterday to each member of the committee to go in as a part of your statement?

Gen. MENOHER. That is, on the committee print? Yes; I desire it to go in the hearing also. That pertains particularly to the committee print of the bill for the reorganization of the Army, in which there is a section devoted to the reorganization of the air service.

(The letters referred to follow:)

WAR DEPARTMENT,
OFFICE OF THE DIRECTOR OF AIR SERVICE,
Washington, December 16, 1919.

From: Director of Air Service.
To: Gen. John J. Pershing, Washington, D. C,
Subject: Request for statement regrading a separate air service.

1. I believe that the press of the country either misunderstands or misinterprets your views on the needs of the Air Service as expressed at the joint meeting of the Senate and House Committees on Military Affairs. The attached photostats will disclose what is reaching the public and leading them to believe that you favor such a "separate air service," as is proposed in the New and Curry bills. To correct this interpretation of your views, which I consider an incorrect and erroneous interpretation, I request your answer to the following questions:

2. (*a*) Can military forces be efficiently trained or can they operate efficiently without an air force?

(*b*) Can an air force, acting independently, win a war against a civilized nation?

(*c*) Can an air force, by itself, accomplish a decision against forces on the ground?

(*d*) Is an air force an essential combat branch and should it form an integral part of an army?

(*e*) To insure success, is it necessary that the air force be controlled in the same way, understand the same discipline, and act in accordance with the Army command under precisely the same conditions as do the other branches?

(*f*) Is it essential, in order to establish battle control, that the air force, equally with the other branches, must fully understand its exact functions in working with the other branches, know their needs, be in full sympathy with them, ink in the same military atmosphere and have the same esprit de corps?

(*g*) If the above conditions are essential, can they be brought about in any force unless it is an integral part of the command, not only during battle but also during the entire period of its doctrinal training?

(*h*) Can such conditions be obtained in a force that is but a temporary attachment to a command?

(*i*) Is the air force of sufficient importance to be a separate branch of the service, coordinate with the Infantry, Cavalry, and Artillery?

(*j*) The New and Curry bills propose a separation of the air force from the Army and Navy, and provide for its training under a director of aeronautics.

so that it may comprise a combatant force distinct from the Army and Navy. Do you favor a separate Air Service as provided in these bills?

(*k*) Is any quotation of your views as favorable to a separate Air Service *correct* if it refers to a separate air force without the Army as provided by the New and Curry bills or is such quotation correct only when it refers to a separate branch of the service, within the Army, separate only as the Infantry and Cavalry are separate?

3. The purpose of this request is to get your real views before the public. I believe my purpose would be best accomplished by your giving to the public your answers to the above questions. If such a course is not feasible, I request permission to publish your answers here.

4. It should be remarked that this categorical presentation of the matter is not intended to influence you to reply categorically to the questions asked, or even to suggest the form and nature of your reply. It was felt, however, that a specific outline of the points raised in this connection would not alone be the easiest way of presenting the matter, but would be one of convenience to you in formulating your reply.

CHAS. T. MENOHER,
Major General, United States Army, Director of Air Service.

DENVER, COLO., *January 12, 1920.*

Maj. Gen. CHARLES T. MENOHER,
Director of Air Service, War Department,
Washington, D. C.

MY DEAR GEN. MENOHER: I am at a loss to understand how my opinion on the question of a separate Air Service as expressed at the joint meeting of the Senate and House Committees on Military Affairs could be misinterpreted. In those hearings, and on many other occasions, I expressed my view that the Air Service for military purposes should remain a part of the Army. I urged, of course, the very great necessity for developing aviation in a commercial way and for other than military purposes as an invaluable adjunct to military preparation in time of peace.

Before the joint meeting of the Military Affairs Committees I indicated my belief that some cooperation and coordination between the different departments of the Government using airships might well be obtained and, in fact, that such coordination was essential to the development of aviation. The question of coordinating the industrial end of aviation is, of course, an entirely different matter from the proposition of taking away from the Army this Air Service and establishing a Department of Aeronautics independent of the control of the War Department.

I am very glad to answer the questions you asked in your letter specifically, and I am giving my answers below the same headings that you gave your questions.

2. (*a*) Military forces can never be efficiently trained nor operated without an air force.

(*b*) An air force, acting independently, can of its own account neither win a war at present time nor, so far as we can tell, at any time in the future.

(*c*) An air force by itself can not obtain a decision against forces on the ground.

(*d*) A military air force is an essential combat branch and should form an integral part of the Army.

(*e*) If success is to be expected the military air force must be controlled in the same way, understand the same discipline, and act in accordance with the Army command under precisely the same conditions as other combat arms.

(*f*) An air force, as well as all other branches of the Military Organization, must fully understand its exact functions in working with other branches, must know the needs of other branches, be in full sympathy with them, think in the same military atmosphere, and have the same esprit de corps in order that effective battle control may be established.

(*g*) No such force can realize the above condition unless it be an integral part of the command not only during battle but also during the entire period of doctrinal training.

(*h*) To realize these conditions the different arms of the service must live together and train together.

(*i*) An air force should be established as a separate arm of the service, coordinate with the Infantry, Cavalry, and Artillery.

(*j*) An air force should not be established as a combatant force distinct from the Army and Navy.

(*k*) The only view that I have ever expressed on the question of the Air Service for military purposes is that such service should be established as a separate branch within the Army, and separate only in the same way that Infantry and Field Artillery are separate.

On my present tour of inspection I have had occasion several times to refer to my opinions on the Air Service. I shall probably again refer to this question, but I have no objection to your utilizing this letter in any way you see fiit.

Very truly, yours,

JOHN J. PERSHING,
General of the Armies of the United States.

JANUARY 28, 1920.

Representative W. FRANK JAMES,
Committee on Military Affairs,
House of Representatives.

1. Arrangements were made for me to appear before your committee on January 23 for the purpose of presenting my views as to the application of the provisions of the bill in committee print for the reorganization of the Army as affecting the Air Service. It was a great disappointment to me that on account of illness I was unable to respond in person, and therefore Gen. Mitchell was requested to represent me.

2. It occurs to me that a specific statement of my views with special reference to pages and sections of the bill under consideration may be of convenience to you. I am therefore submitting the following:

There are some special conditions applying to the Air Service which make the solution of its problem different in certain fundamental features than that for the rest of the Army. Therefore, in these cases it is thought unwise that the provisions for the Army at large be followed to the extent that lasting injury to the building of an efficient Air Service in the Army will result therefrom. These special conditions arise almost entirely from the following facts:

(*a*) Unlike the rest of the Army, the Air Service is now a temporary organization from top to bottom, with only 140 Regular officers, most of whom are captains in the Regular Army, the remainder all being emergency officers.

(*b*) On account of physical and psychological reasons the period of a man's life in which he can remain an efficient combat flyer is short. The enlisted personnel of Air Service squadrons is not the fighting element—the fighting element is the officer personnel; consequently two-thirds of this force is in the grades of first and second lieutenant.

(*c*) If the system of organization applied to the rest of the Army were to be applied to the Air Service, a congestion of officers too old to be effective as combat flyers would result, and the number of such ineffective flyers would exceed the requirements for aerial commanders and for other Air Service duty. This excess of ineffective flyers in the Regular Establishment can be entirely avoided by reducing the number of lieutenants in the permanent establishment to approximately 700, equally divided between the grades of first and second lieutenant for that total number of officers carried in the bill under consideration, namely, 1,800. All other lieutenants in the Air Service should be Reserve officers ordered to active duty for two or three years. About 2,500 of such Reserve officers should be on duty with the Air Service at one time. It is now proposed that the law shall be such that Congress may determine each year in fixing the appropriation what that number of Reserve flying lieutenants on active duty shall be. This plan will build up a reserve of flying officers in the Reserve Corps who could be used as captains and majors of the Air Service when expanded to war strength.

The building up of a flying reserve is a much more difficult problem than building up a reserve for the rest of the Army for obvious reasons, some of the most important of which are as follows:

(1) Flying is not yet in any sense a general accomplishment, thus the field from which even partially trained reserves may be drawn is very limited and at present can be extended only by governmental effort.

(2) The expensive and perishable equipment which must be provided in order to train the reserve.

(3) The comparatively short period during which the trained reserve flyer can be maintained as an effective.

(4) The relatively long period of time necessary to turn out a trained air fighter.

(5) The necessity for constant practice for the reserve if they remain fit for active service.

(6) The fact that the Air Service must at the break of hostilities operate far in advance of any other arm requires a reserve ready at a moment's notice.

Reference to the bill:

Page 5, section 3: The Air Service made a detail corps below the grade of major. This is to be avoided. For reasons stated above, the entire 1,800 officers should be made permanent in all grades. It is the inactive reserve that the trained personnel for use in war in the Air Service should be built up, not in the other branches of the Regular Army. Every flyer put into civil life becomes an active force for the development of aeronautics in the country, thus making his potential value to the country many times what it would be if by a detail system lieutenants were taken from other arms of the service, detailed to the Air Service, and after learning to fly, were detailed back into the Regular Army, where they would cease to fly and would then perform other duties normally incident to the arm of service to which they returned. The Government can receive the value of money spent on the training of these flying officers only by passing them into civil life, where they contribute to that general development of aeronautics which will hasten the time when flying becomes sufficiently general to warrant a reduction in the size of the permanent air forces.

Page 5, section 4 (a): Warrant officers required in Air Service; restriction as to length of service practically prevent warrant officers for Air Service. The restrictions contained in this section prevent the Air Service from having warrant officers and from giving the grade of warrant officer to many men who have demonstrated fitness therefor by service during the war. This situation arises because the Air Service is new and not 10 years old, the term of service prescribed as a prerequisite to appointment as warrant officers. The best men and most expert mechanics who have come into this new service have, as a rule, not over two years service. Every inducement is required to hold these men in the service for their expert qualifications command very high pay in civil life.

Page 8, section 4 (b): Pay of most valuable part of enlisted force decreased 50 per cent. The General Staff made a very exhaustive study of the matter of pay and rating for the enlisted force of the Army. The results of that study are embodied in toto in the draft under consideration, except that the ratings for aviation mechanicians and balloon mechanician, as now provided by law, have been omitted in the committee print. It is informally understood that this omission is due to inadvertence. The following is proposed as a correction:

"*Provided*, That the provision of existing laws providing for the rating and pay of aviation and balloon mechanicians of the Signal Corps shall be and are hereby made to apply to the Air Service of the Army."

Sixty per cent of the enlisted personnel of the Air Service are required for duty as machinists and mechanicians. Of this 60 per cent a certain number are required to be expert machinists in every sense of the word—men who in civil life can easily receive $10 to $15 a day. In the Air Service, unlike the rest of the Army, one small mechanical mistake is generally all that can happen on one plane. The crash due to that one mechanical error results in a very great loss to the Government, in the destruction of the plane and the death or incapacity of the flying personnel. The rating, with increased pay, for these aviation and balloon mechanicians, is required to secure proper mechanics.

Page 32, section 13 (a): Flying pay. Extra pay eliminated by this bill for that flying which presents greatest hazard. Statistical data was presented to the committee covering the extent and nature of the hazard incident to flying. Some of this data is attached hereto. Only the following extract will be shown here:

ACCIDENT DEATH RATE OF FLYERS THREE TIMES BATTLE DEATH RATE OF OTHER OFFICERS.

The death rate for battle and accidents among flying officers who served overseas was over five and one-half times that of officers of all other services. Flying officers receive additional pay because of the extra hazard incurred.

For deaths from accidents alone, the rate among flying officers overseas was nearly 49 times that of all other officers and over 3 times the battle death rate of other officers.

Figures for total number of officers serving overseas include 16,782 commissioned in the American Expeditionary Forces.

Officers.	Overseas.	Deaths by battle.	Deaths by battle and accident.	Deaths by accident.	Death rate per 1,000 who served overseas.		
					Battle.	Accident.	Total
Flying	4,318	236	532	296	54.6	*68.5*	123.1
All others	96,484	2,001	2,140	139	*20.7*	1.4	22.1
Total	100,802	2,237	2,672	435	22.2	4.3	26.5

Casual and cross-country flying, that character of flying of which officers do the most after passing through primary and advanced training, is five times as dangerous as that of primary training. For this kind of flying the bill under consideration does not allow any extra pay for flying hazard.

Existing law provides for one advanced grade in rank and 50 per cent increase in pay for those rated at junior military aviators, allows 25 per cent increase in pay for those flying but not rated at junior military aviators, and provides that a junior military aviator, after three years' service as such, may be rated as a military aviator and receive 75 per cent increase in pay. The application of this law, which was enacted prior to the war, caused great discontent among the emergency officers, for the reason, in order to give them the 50 per cent increase in pay which was being drawn by most Regular Army flying officers, it would have been necessary to have advanced them in rank, thereby placing them in positions of command for which some were not qualified. Those emergency officers who by age and experience were found competent to exercise command were promoted without reference to rating in aerial flight. It is considered highly desirable that the conditions which worked so unsatisfactorily during the late war be removed and that a flat percentage increase of 50 per cent be given to all commissioned officers, warrant officers, and enlisted men who participated regularly and frequently in aerial flight. It has been suggested that a flat increase in a stipulated sum be allowed without reference to rank. The reasons for a flat percentage increase are as follows: As an officer grows older and his rank increases, his adeptness in flying diminishes and his hazard increases. It may be said that he is getting a higher rate of pay on account of his higher rank, which comes from increased years of service; but that is true of all the Army. He gets the extra pay of his advanced grade for extra responsibility. Then again, practically the result is this: As the officer grows older he realizes that his adeptness for flight is diminishing; that he is, consequently, subjected to a greater hazard relatively, and the flat percentage increase in pay serves as an additional inducement for these officers to continue active flying under conditions where it is increasingly easy for them to secure less hazardous duty. Experience has shown that an efficient air service requires an extremely high morale. Frequent participation in aerial flight on the part of senior flying officers acts as a stimulus to all under their command.

To correct the pay situation it is recommended that the last six lines on page 32 and the first line and first word of the second line on page 33 be stricken out and that the following be substituted therefor:

"Any officer, warrant officer, or enlisted man of the Army, while a member of the Air Service, or detailed in or attached thereto, shall, while on duty that requires him to participate regularly and frequently in aerial flight, receive an increase of 50 percentum of the pay of his grade and length of service: *Provided*, That all provisions of law now in effect creating the ratings for commissioned

officers for proficiency in the theory and practice of aeronautics and governing the granting of such ratings or providing increase in rank, pay, or allowance therefor, are hereby repealed: *Provided further*, That regulations for the rating of commissioned officers, warrant officers, and enlisted men for proficiency in the theory and practice of aeronautics shall be prescribed by the Secretary of War."

Page 32, section 13 (a): Enlisted strength of Air Service inadequate. A very conservative minimum strength of Air Service required with the Army provided for in this bill is 38,000 enlisted men. I have consistently urged this number to the War Department. I desire to make clear that this strength of Air Service is based solely on demonstrated accomplishment and capabilities of aircraft in the state of its development to-day, and includes nothing based on a prediction as to new developments and new military uses of aeronautics, This strength is determined by the rejection of every proposition that is not thoroughly conservative. However, it is my opinion that this strength can not be economically and efficiently organized in its entirety during the coming year. A careful survey of the situation leads me to believe that the strength which can be efficiently and most economically organized during the next year is about 23,000 or 24,000 enlisted men, and I therefore strongly urge that the enlisted strength be increased from 16,000 to 23,000.

Page 33, section 13 (a): Flying cadets counted in enlisted strength. After the last word in line 4, page 33, strike out the period and the quotation marks and insert a comma followed by the words: "except as provided in this section. *Provided further*, That the total number of flying cadets shall not at any time exceed two thousand five hundred, who shall be in addition to the enlisted strength otherwise authorized herein for the Air Service."

This is necessary since no enlisted man's work is performed by the flying cadet, whose entire time is consumed in his training for the duties of an officer prior to his entering the reserve as an officer. In this manner the great bulk of the combat flying personnel will be built up in the reserve. Their period of training as flying cadets will not qualify them in the duties of command. They will, however, be qualified for the work of the individual fighting pilots and observers. The commanding officers; that is, the aerial commanders for the squadrons which would in time of war be formed from these flying cadets, will be provided in this scheme from the reserve officers who have served for a period as reserve officers on active duty with the Air Service. The Army of a strength provided for in this bill could be expanded in time of war to about a million and a quarter men. Due to the rapid rate at which flying officers lose their topnotch effectiveness for combat flying, this number of flying cadets is taken as the number which will build up the reserve flying force sufficiently to provide a reserve for the Army of a million and a quarter in not less than eight years. While it is thought that the reserve of flyers should be built up more rapidly, the training of 2,500 flying cadets annually will allow a conservative start to be made.

Page 58, end of section 24 (c) and before section 24 (d): Application of single list to the Air Service. I am strongly in favor of the single list and believe that it should be applied to every part of the Army to the maximum extent possible, and that no exceptions be made thereto unless its effect is decidedly injurious to the interests of the Army as a whole, and that exceptions, where made, should continue only temporarily. In application of the single list to the Air Service it should be remembered that the Air Service must be constructed in its entirety by this legislation. There are officers in the higher grades of all other combatant arms of the service who have reached these grades by many years of service in those arms. Owing to the nature of the duty required with the Air Service, those who have heretofore had experience in it and who have been trained in the school of actual war, are comparatively young men. This applies alike to the flying personnel and to others performing important specialized duty who have not yet had a chance to learn to fly. The officers of the Air Service who now belong to the Regular Army are nearly all in the grade of captain, there being no colonels, two lieutenant colonels and four majors. The present provisions of this bill would make it necessary to fill up the higher grades in the Air Service with emergency officers of two or three years' service, or less, and to place below them Regular Army officers who have served in the Air Service and who have from 10 to 15 or 20 years' service.

The only other solution is to place the emergency officers below the Regular Army officers of long service, and to not fill the higher grades at all, but to do

this would be placing the emergency officers in lower grades than those in which they are well qualified to render the Government valuable service. Under these circumstances, if the higher grades were filled at all they would be filled by officers from other branches of the service who have never served in the Air Service and know nothing about it, and who have reached an age at which they never can, by actual air experience, become qualified. The medical statistics collected from the examination of thousands of applicants during the war show that probably less than 75 per cent of the officers of the Army over 45 years of age, and 50 per cent over 35 years of age can pass the physical examination required for aviation, and that officers over 35 yers of age should not begin to learn to fly. It is proposed to remedy the difficulty growing out of this difference between the Air Service requirements and the requirements for the rest of the Army by the application of a temporary remedy, which is as follows:

Let the Air Service come in on the single list as provided for all the rest of the Army, and then in cases where there is no other officer in the Army qualified by actual Air Service experience to fill vacancies still remaining in the Air Service, let such vacancy be filled by the temporary promotion of the next senior qualified for that duty, wherever he be found, whether in the Air Service or in any other arm of the service, provided only that he be willing to transfer to the Air Service if not already an officer of the Air Service. Thus, it will be seen that any temporary increases in rank will be open alike to the entire Army. To take a concrete example: If the major commanding a squadron be killed and if there be no other major in the Army either in the Air Service or in another part of the Army qualified to command that squadron, then give to the senior captain in the Army, whether he be in the Air Service or outside of the Air Service who is qualified to command that squadron, the temporary rank of a major until such time as a qualified major of that permanent rank may become available for the duty, whther he be in the Air Service or in some other part of the Army. It is proposed that these temporary promotions shall not carry increased pay, only the rank necessary for the performance of the duty which will be required of the individual. This is not a special favor and is not covered by the provisions of note on page 120. This situation can be remedied by an amendment at the end of section 24 (c) as follows:

"*Provided*, That the proportion of officers of the Air Service in each of the grades above that of first lieutenant shall not be less than for each corresponding grade of the Army taken as a whole. The original vacancies in the Air Service created by this act shall be filled as far as practicable by appointment from among those who have served creditably in the Air Service or while attached thereto for duty as officers or enlisted men for a period of at least six months since April 7, 1917, and any vacancy thereafter remaining shall be filled by the temporary promotion of officers of the Air Service, said promotion to be in order of seniority, as provided by section 24 (a) of this act: *Provided further*. That officers while holding temporary promotion shall receive the pay and allowance of their permanent grade."

Page 69, section 37 of unrevised national defense act: Existing law for active duty by reserve officers of Air Service inadequate. As shown in paragraph 2 (c) of this memorandum, a large percentage of the lieutenants of the Air Service should not be permanently commissioned but should serve as reserve officers on active duty for a period of three years or less; this in order that there may not be a congestion in the permanent establishment of older officers who have outlived their effectiveness as combat flyers. This defect may be corrected by amendment as follows:

Page 69, section 37 of existing law, paragraph 5 thereof, line 6, after the word "Corps," insert "and officers of the Air Service Section of the Officers' Reserve Corps,"

Page 81, section 37: Enlisted Reserve Corps abolished. This seriously affects Air Service efficiency and materially increases cost of Air Service. As previously pointed out, the enlisted part of the Air Service is not its combat part. The enlisted personnel simply maintains the mechanical plants which enable aircraft to be flown by the commissioned personnel. Unlike other combatant arms, to a certain extent the enlisted force of the Air Service could be better trained in machine shops, in civil life, than by the performance of strictly military duty. Reserve officers on inactive status will be scattered all over the country and can be made very effective in recruiting an enlisted reserve force of the mechanics. This force not only will be of great value for the expansion of

the Air Service in time of war or an emergency, but will contribute very materially to the maintaining of aircraft in such condition that these reserve officers on inactive status may retain their ability to fly by frequent practice in aerial flight.

The Air Service Reserve should be a Federal force in every sense of the word for the reason that it should be directed by Federal and not by State means for the general development of aeronautics in the United States. Any flying fields or airdromes provided for the use of this reserve should be made to serve every other Government use whether for the War Department, the Post Office Department of other department of the Government, and for the encouragement of civil aviation. These conditions all point strongly as to the necessity for the reserve being a strictly Federal Reserve without complications by State control.

C. T. MENOHER,
Major General, U. S. A.,
Director of Air Service.

Fatalities in Air Service, years 1918 and 1919.

	1919	1918	American Expeditionary Forces.	Average.
Primary	2,478	2,310	2,386	2,394
Advanced	1,832	2,000	1,487	.....
Casual and cross country	274	730	.....	.....

For primary training, the average number of hours flown per fatality for training in the United States in 1919, 1918, and in the American Expeditionary Forces, was practically 2,400 hours.

For advanced training, the average number of hours was 1,740, but when it is taken into consideration that most of the advanced training in the United States was done in primary types of planes, the figure 1,487 from the American Expeditionary Forces will probably be nearer the correct figure for advanced training in peace time.

For casual and cross-country flying in 1918, 730 hours were flown per fatality, and in 1919, 274 hours.

The flying done in 1919 shows that casual and cross-country flying was about nine times as dangerous as primary training. However, it is considered that the flying done in 1919 was of an extra hazardous nature, and probably an average between the figures of 1918 and 1919 will be nearer what you can expect in the future for this kind of flying. This would make approximately 500 hours for casual and cross-country flying, showing that on the average this kind of flying is about five times as dangerous as primary training.

In the year 1919 there was a fatality for every thousand hours flown. Unless this rate can be cut down considerably, which is doubtful, these figures mean that in four years from this date that half of the military pilots will have been killed in airplane accidents.

Mr. JAMES. Anything further, General, on the bill?

Gen. MENOHER. I think there is nothing else.

Mr. FISHER. General, we have before us the bill which was more recently introduced by Mr. Hull, H. R. 12134, and the bill introduced by Mr. Morin, which is H. R. 11206. You have studied both of these bills, and I am going to ask you to state which of these two bills you think would be the best step for Congress to take to promote and foster aeronautics.

Gen. MENOHER. The Morin bill more nearly meets my views on the subject, but as I said before, Mr. Hull's bill agrees with my idea, or I agree with Mr. Hull's ideas, in two of the three fundamentals: The Army and Navy keeping its own personnel, and an agency for production and to handle the civil activities of aviation.

Mr. FISHER. Can you give us some idea as to the amount of money it would take to put in operation the department under the Morin bill as compared with that under the Hull bill, if you think there is a difference, or have you estimated whether or not there would be a difference in the cost to the Government in the putting into operation of machinery of the department of aeronautics under the Hull bill and under the Morin bill?

Gen. MENOHER. I have not made such a study, but I can see that there would be very little difference between the two, and the cost of putting either in would be very slight, to my mind. It would not be great.

Mr. FISHER. The difference under the Hull bill would be largely as to the program that Congress would initiate, would it not, so far as the manufacture of aeroplanes is concerned?

Gen. MENOHER. Yes, sir.

Mr. FISHER. And Congress itself would determine the amount of money it would care to expend along that line?

Gen. MENOHER. Yes, sir.

Mr. FISHER. So that in so far as the expense of operation of the department of aeronautics under the two bills is concerned, they are practically the same, except in so far as the Government might go into a program of manufacture, and that would be determined by the amount of money that Congress would appropriate for that purpose.

Gen. MENOHER. Yes, sir. I think the cost would be about the same under either bill.

Mr. FISHER. Now, I would like to get your opinion as to the difference between these two bills, as to the effect upon the efficiency of the Army and the Navy, largely from you as to the Army? In what respect do you think the Morin bill would keep the Army more efficiently than the operation under the Hull bill?

Gen. MENOHER. As I said before, in the case of the Hull bill it meets my views in regard to two those fundamentals.

Mr. FISHER. The question of personnel.

Gen. MENOHER. The question of personnel. The Morin bill, to my mind, more nearly meets our needs in the matter of experimental development. In the matter of procurement the two bills become practically the same again, as I understand it, under the changes that I would urge in the Hull bill.

Mr. JAMES. General, in the statement that you sent us to-day, is it shown how much money would be saved by having a separate air service?

Gen. MENOHER. No, sir; I think not.

Mr. JAMES. Would you want to put in the hearings before we close a statement of what you thing would be saved by a separate air service intead of each department having its own appropriation?

Gen. MENOHER. As I say, I have not made any calculation of that kind. It would take some little time to do it.

Mr. JAMES. I was told a few days ago that the figures would show that there would be quite a few million dollars saved by having a separate air service and passing a separate bill instead of making appropriations direct to the various departments. I was wondering whether you had made any estimate.

Gen. MENOHER. I can not see how it should be so, because I think the overhead created by the separate department of aeronautics, and by that I mean such as is contemplated by the New bill, would be such as to entirely eat up, and more, any saving that might come from lack of duplication.

Mr. HULL. General, what is this provision in the Morin bill?——

For the purpose of computing aeronautical duty as required by this provision the duration of any aeronautical duty performed in the Army or Navy since April 6, 1917, and prior to the date of passage of this act shall be doubled.

Gen. MENOHER. It is in regard to the personnel in the Air Service and the credit for duty with the Air Service. We wanted to establish a rule in regard to length of service in the Air Service, and for the purpose of carrying the work beyond the present, we doubled that part of the service. There is going to come a time when every man in the Air Service will be a flying officer, but just now we are at the point where everybody is very new to it. Some have not had an opportunity to qualify, some of the most valuable officers.

Mr. HULL. That is particularly with reference to operations.

Gen. MENOHER. Yes, sir.

Mr. HULL. That more properly belongs to the reorganization bill rather than to these bills.

Gen. MENOHER. Yes, sir; probably so.

COMMITTEE ON MILITARY AFFAIRS,
SUBCOMMITTEE ON AVIATION,
HOUSE OF REPRESENTATIVES,
Monday, February 9, 1920.

The subcommittee met at 3 o'clock p. m., Hon. W. Frank James (chairman) presiding.

Mr. JAMES. The subcommittee has met this afternoon to hear the Assistant Secretary of War, Mr. Crowell, in reference to H. R. 12134. You may proceed, Mr. Secretary.

STATEMENT OF HON. BENEDICT CROWELL, ASSISTANT SECRETARY OF WAR.

Mr. CROWELL. Mr. Chairman, I am going to be very brief. You have had long and exhaustive hearings on aviation, and the question of agreeing on a verdict is practically the question before you now.

Mr. JAMES. You have been heard on all the bills in connection with aviation, I believe, except the last bill, introduced by Mr. Hull. You appeared before the committee some time ago?

Mr. CROWELL. I did.

Mr. JAMES. The only new bill we have before us, upon which you have not been heard, is H. R. 12134?

Mr. CROWELL. I appeared on the Curry bill.

Mr. JAMES. We would like your views more especially on this bill, H. R. 12134.

Mr. CROWELL. The assessing of these opinions at their true value is really where you stand to-day, and it seems to me the obligation is a very heavy and important one, because, in my opinion, the safety

of the whole Nation depends on the proper solution of this aviation problem.

In assessing these opinions, some facts are very clear to-day. In a general way it may be said that the Army men are in favor of the Army retaining control of all aviation matters, and the Navy men insist that they must retain control. The fliers, as a rule, are in favor of a separate department of aviation.

Another fact is that a careful study of the case seems to make converts to the proposition of a separate aviation department. The more it is studied, I believe, the stronger becomes the belief with each individual that a separate department is a necessity. As an example of that, the action of the Haan board is, perhaps, interesting. I discussed that with you on my last appearance in connection with aviation. Another example of that is a statement by Senator King in the Senate during the debate on the New bill, as found on page 2597 of the Congressional Record, where he said:

> I will say to the Senator that I began the study of the bill with some prejudice against it. I read some of the testimony which was scattered through two large volumes, and the more I investigated the subject the more I was convinced of the merits of the bill.

My own experience has been right to the point. A year ago I was thoroughly convinced that the Army ought to retain all its aviation activities. At that time I had studied the question only as many other men in the War and Navy Departments had. But an intensive and careful study of the subject during all of last summer has made me change my mind entirely. So, I think many illustrations can be given to that same effect.

Furthermore, those who have no direct connection with the Government have expressed themselves to a great extent in the same way. And those who have no connection with the industry are practically all of the same opinion. I refer to the public at large. Public sentiment throughout the country is overwhelmingly in favor of a separate department of aviation. There is no newspaper to-day, espesially in the large cities, that is not in favor of a separate department of aviation. This is known by me to be a fact because I have for many months had a clipping service and have carefully watched every editorial on the subject. The large newspapers, such as the New York Tribune—I have a number of articles here which you have probably seen—the Chicago Tribune, the St. Louis Star, the New York Times, the San Francisco Bulletin, the Boston Transcript, the Brooklyn Eagle, the Philadelphia Evening Bulletin, the New York Herald, the Christian Science Monitor, and many other papers of that kind are in favor of a separate service.

Mr. HULL. The Chicago Tribune only last Tuesday had an editorial in which they rather took back something they had said, but they were still in favor of a united air service, and practically as I have provided for it in the bill we are discussing. They thought that the New bill went too far. I think in the editorial they rather indorsed the new bill I introduced, did they not?

Mr. CROWELL. Yes. The American Legion had also indorsed a separate aviation department.

Going a little further into the matter it is perfectly evident that although a good many of the opinions may not be easily reconciled on

many points at least 90 per cent of all the opinion agrees. In grouping the instances under this heading, at least 90 per cent of all the testimony would agree that a department for civilian aviation should be established. That is work which at the present time is not covered by any existing department and can not well be covered except by a separate, independent department. The functions of that department have been described and I will not attempt to go into them.

The next thing on which there is practical agreement is that the division of production and procurement is necessary and should be centralized in a separate organization. Here is a large amount of duplication as things have existed, and that can be avoided by the consolidation of those activities in one department.

Mr. JAMES. Would you have this new department design machines, or have the Army design its own flying machines and have the Navy design its own flying machines? Would you have it arranged so that the Army and the Navy shall design planes and also the new department, but that no machines can be manufactured unless the designs had been approved by the new department, or would you leave that entire matter to this separate department?

Mr. CROWELL. My next item would cover the subject of engineering and design common to all aviation. That should be in that separate department by common consent. Ninety per cent of the opinion favors that. It avoids much duplication going on to-day. Engineering and design that is specialized could well be handled by the special departments as it is to-day.

Another of the functions of that department of aviation, on which there is, I think, a universality of opinion to-day, is that the Army and the Navy and the Post Office Department should operate with their own men those planes that are closely connected with their own service in which they are specialists. That would cover, of course, observation planes for the Army and Navy, and there is, of course, no duplication there by allowing them to retain that function. They should also train their own men for this special work. The special training should be given by each of these special departments, and the specialized engineering should, of course, also be done by the special departments.

We have, then, a practical agreement on all those points to-day, leaving only two points on which there is a great difference of opinion. One of those two points is the matter of teaching men to fly. We have separate departments to-day teaching men the same thing, because flying is the same, whether they fly in the Navy or in the Army. By teaching them to fly, I mean teaching them to maintain themselves in the air. I see no reason why that should not be in one department, because by putting it in one department we would get better service and would avoid the duplication that exists to-day.

I would add that there is no doubt as to the success of that, because the Army has recently actually trained men for the Navy, and the Navy has written and expressed its satisfaction with this work. A letter from the Secretary of the Navy, dated only a few days ago, is in the files of the War Department. That leaves only one item on which there is a great divergence of opinion, and that is in connection with the fighting air force; and by that, I mean the pursuit squadrons.

Here is a great duplication. The conception of the Army and of the Navy is, to my mind, a narrow one, and differs from the broad viewpoint from which we should consider this matter.

In all this testimony of the Army and Navy officers you will see the repetition of terms; that the airplanes are the eyes of the Army; that aviation is an adjunct of the Army and of the Navy, and that naval aviation is a part of the fleet. Those views are all expressed by Army and Navy officers, and I think they result from a very narrow outlook. They mean a weak defensive policy in case of war. The broad view that we must control the air means a strong offensive policy, by which we must get control of the air and maintain control of the air and keep the other people out of it. That is the only view, in my mind, that can possibly succeed in case of a war. And, based on that view, I favor a separate department of aviation, controlling the flying air force; that is, the pursuit squadrons.

The opinion of the great military authorities is that great aerial activity will be displayed immediately upon the declaration of the next war, and the nation that has its force organized so that it can get control of the air will have a tremendous advantage in the later fighting, whether it be on land or on sea.

In order to be prepared for this early fighting in the next war, a single fighting force, it seems to me, would have a great advantage over a divided air force, divided between the Army and the Navy, because a single air force can be maintained much cheaper than the same force if maintained by the Army and also by the Navy.

Mr. JAMES. Suppose we find that it is absolutely impossible to put through a bill that goes that far and we find that by agreeing upon a compromise bill we can get it reported out of the Committee on Military Affairs and it can be taken up on the floor. Would you advise reporting out a substitute bill if you thought it could be put through the House and Senate, or would you advise reporting out a bill which is not a compromise measure, and take the chance of getting it through?

Mr. CROWELL. If I were a Member of Congress, I should report out a bill that I thought would pass. But I do not feel that you want me here to advise you on that matter.

Mr. JAMES. If you were a Member of Congress and you felt that there was not a chance of getting through what you or I might want, and you find that the next best thing is to report out a compromise bill, you would be in favor of reporting such a bill, with the idea that it could be passed at this session?

Mr. CROWELL. Yes; I should think so.

There is one other point I wish to bring up before I leave the general subject, and that is the fact that the tactics of air fighting are entirely new. Before the World War one plane was as much as any Army sent out at a time, I believe. But at one time the Allies sent out a force of 400 planes over the German lines. And in the next war we may have many thousands of planes in one force, and the maneuvering of such a large number of planes is a very difficult matter, and the training of all those men driving those planes should be identical, so that the force would go over as a single fighting force. That could not be done if the force were divided between the Army and the Navy. The duplication, of course, that exists in this fighting force, as controlled by both the Army and the Navy, is quite large.

Now, coming down to the details of the bill, H. R. 12134, which was introduced by Mr. Hull, I think this is a very good bill. But I have a few suggestions to make which I think may improve it. My quarrel with it, of course, is that it does not go as far as I think we should go.

In section 2 the bill provides for detailing the assistant directors for a fixed term, this detailing to be done by the President. I fear difficulty there. It is evident, I think, that the assistants should be agreeable to the director of aeronautics. I, therefore, feel that he should have some control over the question as to who is to be detailed. My suggestion would be that there should be an addition to this section which would give the director of aeronautics the right to terminate the term of one of these directors the minute his work is not satisfactory to the director, or if there is an unsympathetic attitude in their work. That, I believe, would give enough control.

Mr. HULL. Would you do that by means of a proviso at the end of the section?

Mr. CROWELL. That might be done.

Mr. JAMES. We will be very glad to have you prepare an amendment carrying out that suggestion.

Mr. CROWELL. I will be glad to do that.

Mr. HULL. I think that is a very good suggestion.

Mr. CROWELL. Section 3, I think, deprives the Army and the Navy of the right to develop types or characteristics of equipment. I think the users of these planes should always be encouraged to stimulate improvement, and that the Army and the Navy and the Post Office Department should be allowed to do a certain amount of development and engineering work, and I would suggest that at the end of the section, these words might be inserted:

Provided, however, That nothing herein contained shall be construed to prohibit the preparation by the War and the Navy Departments of special specifications and general plans and characteristics of aviation, mechanisms, and accessories, or equipment required for military or naval purposes.

Mr. HULL. You think that would be broad enough to cover the designing of a complete airplane?

Mr. CROWELL. I think so. It is intended to be broad enough.

Mr. HULL. I think it ought to be broadened a little. I think it is a very good suggestion, but perhaps the addition of one word there might do it. There was no intention in this bill—my intention was not to prevent their designing and developing of planes or equipment, and I presume under the bill they would have no trouble. But it should be made very clear that they should have that opportunity. I am thoroughly satisfied with that.

I do not know whether it would be necessary to put in this proviso wording to the effect that the director of aeronautics should procure either by purchase or manufacture, any of these special designs and deliver them to the Army or the Navy. Do you think that would be necessary?

Mr. CROWELL. I assumed that was covered by the general terms of the bill.

Mr. HULL. It was intended to be covered.

Mr. JAMES. What would happen in this particular case, if the department of aeronautics should manufacture a machine that in the opinion of the man who was going to do the flying would mean that

if he flew that machine he would be apt to be killed because of faulty construction. What would you say about that?

Mr. CROWELL. I do not think it would be possible under this arrangement. The Post Office Department, let us say, for example, wants to improve their planes in a certain way. They work out that improvement and request its adoption by the production department of the separate service. The production department could not possibly refuse that.

Mr. JAMES. According to the terms of the bill the director of aeronautics is vested with explicit jurisdiction regarding designing.

Mr. CROWELL. I mean as a practical matter he could not possibly refuse.

Mr. JAMES. But some of the fliers claim that they were compelled to use machines which they knew were absolutely faulty and the use of which would be fatal to them.

Mr. HULL. There would not be any more danger of that than there is that the Ordnance Department would produce guns that the Artillery could not use. The Ordnance Department produces all kinds of very dangerous contrivances in war, and there is no difficulty about the use of them, and I think so far as aviation is concerned nobody would produce anything that is going to be fatal and insist on its use. You have never heard of anything of that sort in the Ordnance Department, have you, Mr. Secretary?

Mr. CROWELL. I think Mr. James has in mind certain instances which I have heard of where the infantry, for instance, claimed that they were not getting the machine guns they wanted.

Mr. JAMES. I have in mind a photograph which Gen. Mitchell had here the other day showing a particular make of machine, concerning which he claimed that the flier was in very close proximity to the engine on the De Haviland 4 machine, and they claimed that it was absolutely fatal to a flier, and the flier knew it. But he had to use the De Haviland 4 machine although every time he left the ground he figured that the chances were that he was not coming back.

My idea is that there ought to be some sort of a proviso so that a man will not have to use a machine which he knows will be absolutely fatal for him to use.

Mr. CROWELL. What I meant was that this production division would naturally have the best advice in the country on those things and that a question such as that would hardly arise. It should not arise.

Mr. JAMES. They say that nothing like that should happen; but yet the fliers say that it did happen in the case of a De Haviland 4 machine, and what I had in mind was that it might happen again unless we had some modification of the word "designing."

Mr. HULL. Take the Navy. The men who sail the ships have very little to say about the design of the ship. They never complain. The ship is designed and developed by a board of construction, absolutely separate and distinct from the men who sail the ship. Of course, if they find any defect and make a complaint about it they have no trouble in being heard. They would not have the slightest trouble in this case, I think. That is one thing about a board like the one provided for here, that they would have to recognize every

defect in any machine that they turned out, because if they did not, Congress would get after them.

Mr. JAMES. How long did they keep on manufacturing the De Haviland 4 machines after the fliers claimed that they were fatally defective?

Mr. CROWELL. The complaints about the De Haviland 4 came about as soon as they were put in service, which was about July, 1918, and the plane was kept in manufacture straight through to the date of the armistice. At first it was the only plane of that type that we could manufacture.

Mr. JAMES. I understand they kept on manufacturing the planes although the men who flew them figured that they were taking their lives in their hands every time they went up in a De Haviland 4.

Mr. CROWELL. That was true of a good many planes, I imagine, about that time. I do not believe there would be any difficulty under this bill along that line; and yet, if there is, we should provide for it.

I would like to call your attention to section 4, in which the director of aeronautics is authorized and directed to build factories, and so forth, for the manufacture. As I read it, that is mandatory, that he build these factories, and it may be so construed.

Mr. HULL. I presume it would be advisable to strike out the words "and directed" and simply say he is hereby authorized to build, purchase, and procure.

Mr. CROWELL. That would remove my objection.

Mr. HULL. I thoroughly agree with you in regard to the words "and directed." But they were not intentional. I do not know whether they would carry mandatory instructions or not, but I think they should be stricken out.

Mr. CROWELL. The next suggestion I have is that primary training be included. I have already discussed that with the committee in previous hearings. It would save duplication which is now going on, and the fact that the Army has already trained men for the Navy, I think disposes of any criticism of that kind. It would avoid the duplication going on to-day.

Mr. JAMES. Would the Navy be satisfied with it?

Mr. CROWELL. They have expressed satisfaction with the training we have given their men.

Mr. HULL. Will you send us an amendment along the line you suggest?

Mr. CROWELL. I will be glad to do so.

(Suggested amendments to House bill 12134 are as follows:)

Section 2, strike out in line 11 the word "President" and insert in lieu thereof the words "director of aeronautics." Line 14, substitute a comma for the semicolon appearing after the word "aeronautics," and insert after the comma the words "unless sooner removed by the director of aeronautics."

Section 3, omit the period in line 24 after the word "parts" and insert in lieu thereof a semicolon and add the following:

"*Provided, however,* That nothing herein contained shall be construed to prohibit the preparation by the War and Navy Departments of general plans and characteristics of the aviation mechanisms, accessories, and equipment required for military or naval purposes."

Section 4, strike out in line 2 the words "and directed."

Section 5, strike from line 14 the word "and" and add after the word "equipment" the words "and helium gas." Provide a new section immediately following section 5:

"There is hereby transferred to the director of aeronautics, and he shall forthwith assume control and jurisdiction thereof, all flying and training

fields and stations now under the control of, or operated by, any other department of the Government, together with all buildings and equipment necessary for the proper operation thereof; and the director of aeronautics is hereby vested with complete and exclusive jurisdiction and control of all flying training for aviators of all departments of the Government, except such specialized training as may be required by or for the aviation units of the War and Navy Departments."

Another new section should be added to the bill covering the development, production, and operation of lighter-than-air craft.

"The director of aeronautics is hereby vested with complete and exclusive jurisdiction over the production, procurement, purchase, manufacture, designing, development, and operation of all lighter-than-air craft; and there is hereby transferred to the director of aeronautics all equipment and matériel now in the custody of any other department of the Government; and there is hereby transferred to the director of aeronautics the entire civilian personnel of each and every department and agency of the Government at present exclusively assigned to, or engaged upon, work in, or in connection with, the operation of such lighter-than-air craft; and the director of aeronautics is hereby authorized to employ such other persons as may be necessary for the operation of such lighter-than-air craft."

Mr. JAMES. How many men did the Army train for the Navy?

Mr. CROWELL. I know we trained 50.

Mr. JAMES. How many men have they trained for the Army?

Mr. CROWELL. We are doing all the training for the Navy. The Army, having trained men for the Army and the Navy at the same camp, and having given satisfaction to the Navy, it seems to me that that demonstrates that it is perfectly feasible to give the primary training in one department.

In general, I assume that this bill gives the right to the director of aeronautics to select his personnel. I favor that strongly. I am also assuming that it gives to him the title to the present landing fields. If it does not, I think it should.

Mr. HULL. All fields; and also enables him to allot back, upon their request, to whomever he sees fit.

Mr. CROWELL. I recall that you authorize him to allot back, and it is in view of that that I suggest he therefore must have the title, otherwise he could not allot back.

Mr. JAMES. Section 5 provides:

Section 5. That said Director of Aeronautics shall forthwith assume control and jurisdiction over all pending Government projects having to do, or connected, with the production of airplanes, airplane engines, and aircraft equipment for any department or agency of the Government; and any and all material on hand for such production, all unfinished aircraft and aircraft engines, and all unfinished, unattached, or unassembled aircraft equipment; all lands, buildings, factories, warehouses, furniture, apparatus, machinery, tools, and appliances, and all other property, real, personal, or mixed, heretofore used in, or in connection with, such production, or procured and now held for such use by or under the jurisdiction and control of any department or agency of the Government; all books, records, files, and office equipment used by any department or agency of the Government in, or in connection with, such production; all rights under contracts made by any department or agency of the Government in, or in connection with, such production; and the entire civilian personnel of every department and agency of the Government at present exclusively assigned to, or engaged upon, work in, or in connection with such production, are hereby transferred from the jurisdiction of each and every such department and agency of the Government and placed under the jurisdiction of said Director of Aeronautics to the end that there shall be transferred from the jurisdiction of each and every department and agency of the Government to the jurisdiction of said Director of Aeronautics, each and every function, authority, power, duty, and jurisdiction of every character whatsoever, which relates to, or is connected with, the production of aircraft; all property of every sort or nature used or procured for use in, or in connection with, such production, and the entire civilian

personnel of each and every department and agency of the Government as at present exclusively assigned to, or engaged upon, work in, or in connection with, such production; and all laws prescribing work and defining duties of departments or agencies of the Government with respect to functions transferred to the Director of Aeronautics by this Act shall, in so far as the same are not in conflict with the provisions of this Act, remain in full force and effect and be executed under the direction of said Director of Aeronautics.

The intention is to make it broad enough to cover that.

Mr. CROWELL. I am assuming that that is so. I have just two other matters to suggest. That is in regard to the lighter-than-air ship. The Army is to-day operating a few and the Navy is operating a few. The Navy, I understand, claims that an old agreement exists by which the Navy shall have exclusive monopoly of the lighter-than-air ship. The Army is opposing that.

I understand that question has been before the Joint Board since Last June and no determination has been arrived at. I venture to say no determination can be arrived at because the Navy, I understand, will not recede and it is certain that the Army will not admit that it has no interest in lighter-than-air ships. I would suggest that this matter be settled by giving the new department control and jurisdiction over lighter-than-air ships.

I think the lighter-than-air ships have been wholly neglected by this country. Germany is at least 10 years ahead of us along that line and England is many years ahead of us. Italy and France are also many years ahead of us.

In connection with our success in producing helium, which is a light noninflammable gas to take the place of hydrogen in these ships, that is a subject which becomes one of tremendous importance. If the Germans had had helium gas in their Zeppelins, not one of them would have been shot down. We can imagine what the results would have been. They were all shot down because of the inflammability of the gas they used.

Mr. HULL. What is the status of the helium gas proposition at the present time?

Mr. CROWELL. The experimental work in relation to the production of helium gas has been in the joint control of the Army and the Navy and the Bureau of Mines, and over $8,000,000 has been appropriated and spent. To my mind it is one of the most important developments ever undertaken, and my last suggestion is that the production of helium gas be placed under this separate department.

Mr. HULL. Have they succeeded in producing it in quantities and at a price which would make it practical to use it?

Mr. CROWELL. They have produced it in quantity. The estimated cost is 10 cents a cubic foot, which is cheap enough to make it very valuable.

Mr. HULL. Is there any real practical idea that they can produce it at 10 cents? That is very cheap.

Mr. CROWELL. I do not think there is any doubt in the minds of those who have been at work on it that that can be done, with the knowledge they already have.

Mr. HULL. When we were at Fort Worth they had a plant there and the expense of producing it simply appalled us. It was so high that it seemed almost prohibitive, even in the case of a nation that has as much money as we might have. It would take an enormous

amount of money to pay the cost of sufficient helium gas to fill one of these great gas bags.

Mr. CROWELL. I imagine any statement showing what the cost had been would show a prohibitive cost, but they have assured me that it can be produced at 10 cents.

Mr. HULL. Yet, as you say, that is a matter that is so important that a department like this which is proposed would probably be able to solve the problem, if it had control. As it is now it is all up in the air.

Mr. CROWELL. I hope you will seriously consider putting that under this department. That is all I have to suggest in the way of changes or amendments.

In conclusion, I would like to state that with the addition to this bill of the provision in regard to the lighter-than-air ships, which I have suggested, and also in connection with primary training for fliers, I think you have a very good bill, indeed. And I think, too, while I myself favor adding to it the fighting air force, if you feel it would be better not to do so, I shall concur with your idea and I would recommend this bill.

Mr. JAMES. Do you figure that this is such an important measure that we should report it as soon as possible to the full committee, and that the full committee should report it as soon as possible to the House in order to get action upon it at this session.

Mr. CROWELL. I do think so. I think the sooner this is settled the better it will be. It is very important that it should be settled. I think the matter will be settled in the Senate this session by the passage of a bill along the lines of the New bill, and if some such bill as this is passed by the House, then both Houses would have acted at this session.

Mr. HULL. This would be a good time to have some agency such as the one suggested to assume control, because, to some extent, the entire project of air development is at a standstill, is it not?

Mr. CROWELL. It not only is at a standstill, but if I may mention the case of an aviation company I happen to know about, it will illustrate the condition in the aviation industry. This company was formed by Glen Martin. You know how successful he was in producing the Martin bomber, probably the best machine of that type produced by any company. That company to-day is considering dissolution. The stockholders are tired waiting, and, in my opinion, unless there is legislation within a few months that company will have been lost to us. And the same thing is taking place in other companies to-day. The stockholders are becoming very nervous, and I fear delay in the matter.

Mr. HULL. You do not imagine there would be any great difficulty in getting a man who would be big enough to assume the duties of director, and who would make a success of such a department as is provided for in this bill?

Mr. CROWELL. Not the slightest. I think you could have the choice of almost any man you wanted.

Mr. HULL. The success of it would largely depend upon the personnel, would it not?

Mr. CROWELL. That is very important, of course.

Mr. JAMES. We are very much obliged to you.

(Thereupon the subcommittee adjourned.)

SUBCOMMITTEE ON AVIATION,
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Thursday, February 12, 1920.

The subcommittee met at 10.30 o'clock a. m., Hon. W. Frank James (chairman) presiding.

Mr. JAMES. Gentlemen, Mr. Praeger, the Second Assistant Postmaster General, is here this morning, and we will be glad to have his views on the matter of the creation of a department of aeronautics, especially in reference to H. R. 11206, introduced by Mr. Morin, a bill to create a department of aeronautics, defining the powers and duties of the director thereof, providing for the development, production, operation, and maintenance of aircraft, and providing for the development of civil and commercial aviation; and H. R. 12134, introduced by Mr. Hull, to create a department of aeronautics, defining the powers and duties of the director thereof, providing for the production, development, designing, and maintaining of aircraft, and for other purposes.

STATEMENT OF HON. OTTO PRAEGER, SECOND ASSISTANT POSTMASTER GENERAL.

Mr. PRAEGER. Mr. Chairman, I feel this way about this matter, that unless some change is made in the conduct of aviation in this country, neither the Army nor the Navy, or for that matter the Post Office Department, will be able to obtain equipment enough to operate the planes they have within another year. It is such a specialized industry in which so many manufacturers are concerned, and so many of them have gone out of business that it is difficult now to obtain essential parts for aircraft. I believe that any bill that would tend to coordinate the appropriations for air service work, or tend to coordinate the purchasing of material, would be a great help in keeping the industry alive. I do not believe, and I know and the manufacturers know that they do not need immense appropriations to keep the industry alive, to keep the organization of their experts intact the year around, but what they need is an intelligent distribution of the orders over the year so that they can keep their factory forces going.

They have stated to me that with small orders carrying them through the year so that they can keep their organization intact throughout the year, it would mean more to them than large orders thrown at them haphazard under rush conditions, which would compel them to operate under high pressure for three or four months at one time and then leave their factory idle the rest of the year. Coordination of the production can bring about that condition.

I do not believe all the ills of the aircraft industry can be remedied by this proposed legislation or by any other legislation alone. I do not think the trouble in the Air Service either of the Army or the Navy that makes for the depression that exists now among active flying officers is due to legislation alone or can be remedied by legislation alone, but that it is a matter of policy. Any legislation, however, that will bring new ideas and new life into the operation of aircraft in this country will be a great step forward.

The Morin bill would be a satisfactory bill, so far as the Post Office Department is concerned. The only thing the Post Office Department asks in any of this legislation is that we be permitted to operate our own schedule. If we are not permitted to operate our own plant and our own schedule, then we must be permitted to carry on our air mail by contract, which can be enforced by bond or disciplinary fines on the contractor. We can not operate schedules and have them maintained through a coordinate branch of the Government over which we can exercise no jurisdiction.

Mr. JAMES. Suppose we take up for consideration your proposed amendments to the Morin bill.

Mr. PRAEGER. I would suggest that if the Morin bill is given consideration, the word "operation" on page 3, section 3, line 7, and again in line 22 be eliminated. I would also suggest that on page 5, line 16, after the word "solely," there be inserted the words "to the postal operations and," so that that sentence would read:

That the department of aeronautics shall conduct all development work pertaining to aeronautics, except such as pertain solely to the postal operations and to operation of the military and naval forces.

Then in line 17, after the word "War," I would suggest the insertion of the words "Post Office," so that that line would read: "That the War, Post Office, and Navy Departments shall each determine," etc. And in line 20, on the same page, after the words "War Department," I would suggest the insertion of the words "and Post Office Department."

You see the purpose there was to place the commercial or civil flying of the Post Office Department on an equal footing with the military operations.

Then on page 6, line 20, I would suggest striking out the word "when" and insert in lieu thereof the words "in periods of national emergency as may be," and in line 21 I would suggest striking out all after the word "President," so that that paragraph would read:

The operation of aircraft shall not be a function of the department of aeronautics except in periods of national emergency as may be directed by the President.

Then on page 7, in line 9, in order to conform with the change provided on the previous page, including the Post Office Department. I would change the word "three" to "four," so that it will read:

Consisting of four members, who shall be appointed by and with the advice and consent of the Senate for a term of office of four years.

Then in line 22, on page 7, I would suggest striking out the following words in lines 22, 23, and 24: "not be an officer of the Army or the Navy, shall represent the Post Office and other," and insert in lieu thereof after the word "shall," in line 22, the words "represent the interests of the Postal Service and shall be selected from the personnel of the Post Office Department, and one member who shall represent the other," so that the paragraph will read:

One member of the board of control who shall represent the interests of the Postal Service and shall be selected from the personnel of the Post Office Department, and one member who shall represent the other departments or agencies of the Government not otherwise represented.

I think those are the only changes I would suggest in that bill.

The Hull bill, it occurs to me, presents a satisfactory solution of the problem and one that I would imagine all the governmental activities could agree upon. It is chiefly a measure to coordinate the production and the business administration of the service, the regulatory measures concerning flying, and concentrated in one place the operations of the three departments. Because I take it is intended that the operations of military aeronautics in the Army shall be conducted under the supervision of the assistant director representing the Army and that it is intended that the naval air operations shall be conducted by the assistant director, who will be from the Navy.

Mr. HULL. That is not really the intention. The intention of the bill—and I think it is well defined—is simply to consolidate up to operations. It has absolutely nothing to do with the operations. It is simply the procurement of the planes, the consolidation of all the different functions, taking over and consolidating all the landing fields, and then reassigning them as this board would think best.

Mr. PRAEGER. That would simplify matters, but I think the wording should be cleared up in section 2.

Mr. HULL. It may be desirable to do that in some instances. But there is not any question about that.

Mr. PRAEGER. Then what is meant by these words:

> That there shall be three assistant directors of aeronautics who shall be appointed by the President, and who shall be subordinate to and under the direction and authority of the director of aeronautics, and whose tenure of office shall be the same as the director of aeronautics; that one assistant director of aeronautics shall be detailed from the commissioned officers of the War Department, whose base pay and allowance while on such detail shall equal the base pay and allowance of a major general in the Army, and whose duties shall be to develop, foster, promote, design, and perform any other duties relative to aircraft for the Army.

Does that not include operations?

Mr. HULL. Absolutely no. I do not think the Army men themselves have that idea. This bill was drawn practically by experts and they had no intention of doing that. Some of the men in the Army would like to have the department of aeronautics take over the operations. I myself have always contended that at the present time that would be impossible. I do not know what this would develop. This is simply a proposition to harmonize, and the only reason we have men from the Army and the Navy and one man from civilian life who is supposed to represent the Post Office Department and the other commercial interests of the Government, making three men on the board, is to harmonize the various features of that end of the work in the matter of production and design.

Mr. PRAEGER. Then I was wondering what you mean by performing "any other duties" of the War Department and the Navy Department relative to aircraft for the Army or relative to aircraft for the Navy Department. What other duties would be performed? Is not that expression all comprehensive?

Mr. HULL. Yes, it is, but up to the point of operations only.

Mr. PRAEGER. Would it not be better to clear it up and say "except operations." The Morin bill states specifically that nothing shall be construed as meaning that they shall take over operations.

Mr. HULL. That can be done. There is no intention at all to take over operations. As a matter of fact some of the Army officers would like to see a provision in the bill providing for the taking

over of the primary training. This bill of mine does not do that, but it has been suggested in an amendment presented by Mr. Crowell that we take over primary training.

Mr. PRAEGER. I think it is a good suggestion. We must get some new fliers from some source in the next two or three years.

Mr. JAMES. Here is the suggestion of an amendment by Mr. Crowell. After section 5 insert a new section to read as follows:

There is hereby transferred to the director of aeronautics, and he shall forthwith assume control and jurisdiction thereof, all flying and training fields and stations now under the control of, or operated by, any other department of the Government, together with all buildings and equipment necessary for the proper operation thereof; and the director of aeronautics is hereby vested with complete and exclusive jurisdiction and control of all flying training for aviators of all departments of the Government, except such specialized training as may be required by or for the aviation units of the War and Navy Departments.

What is your idea regarding that proviso, Mr. Praeger?

Mr. PRAEGER. I think this organization should undertake the training, and that the War, the Navy, and Post Office Departments ought to be relieved of the actual training and be permitted to detail men for training to the training fields under the jurisdiction of the director of aeronautics.

Mr. JAMES. How do you train your men to-day?

Mr. PRAEGER. We have not reached that point yet. We have quite a long waiting list of pilots, perhaps two or three hundred pilots who have had close up to 500 hours in the air, and who are a little stale, but they are good fliers. We are not facing that proposition yet.

But there will be a time within a year or so when these men will drift into other occupations, and new men, our young mechanics, perhaps, will want to fly, or there may be a time when we would want to break in some new men.

Mr. JAMES. Do you prefer that they be trained by the Army, the Navy, or some central organization?

Mr. PRAEGER. By some central organization like the one provided for in this bill. I think that is a good proposition, but I also think it ought to be arranged so that the Post Office Department, the War Department, or the Navy Department might detail annually so many applicants for training, subject to the approval of the director of aeronautics.

Mr. HULL. Do you not think it would be better, perhaps, to start in a little slow, and consolidate all your activities up to training, and then if they find that they can take over training, that can be easily done.

Mr. PRAEGER. Speaking only from the standpoint of the needs of the Post Office Department, we do not see any trouble ahead for a year or so, because we have this long list of applicants, men who want to get back into flying, even though they may temporarily go into other business. So for the next year and a half or two years we will not feel the need of fliers; but we will feel that need within a couple of years at least. So far as the Post Office Department is concerned, whether that is included at this time does not matter so much, but eventually, as a permanent policy it would be a good thing.

Mr. HULL. Of course, the director, under the provisions of this bill could at almost any time, with the approval of Congress, take over training; but the question is whether you want to direct him to do it or not. Under the bill without that amendment he would not be supposed to be training them because the intention was to simply let him consolidate the fields, and then allot them to the different branches of the Government as he thought best, with such rules and regulations as he should lay down as to the landing.

For instance, here in the city of Washington, he could readily consolidate Bolling field, the Navy field, and your field into one field, if he found it suitable, and then issue regulations by which all of those departments would use that one field. That is one of the principal points of the bill, that those could easily be consolidated.

My thought has been—I do not say I am sure of it—that this man for at least a year will have quite a big job without having anything to do with the training of the aviators. Let him get his department started and get it up to that point, and then if he thinks best and it is shown that he can do it readily, he might take in that feature, too. Nobody knows where we are going with this proposition; nobody can tell, we have no experience to guide us, we have no analogy; we are simply reaching out into an unknown field. The people who talk about there being an analogy in the Air Service talk about something that does not exist. It is absolutely new, and it has more angles than anybody imagines until they get into the subject.

Therefore, I rather imagine, although I do not object to the proposition, that it would be just as well if we did not include the training right away. As I understand you, you say you have plenty of fliers for a couple of years.

Mr. PRAEGER. Yes, sir; or at least for another year.

Mr. HULL. What do you think of Army fliers being used by the Post Office Department to keep in touch with aviation? It would aid them, would it not?

Mr. PRAEGER. I do not know about that. The carrying of the mails has always been repugnant to Army fliers. For three months they carried the mail between New York and Washington. After a few flights it becomes a monotonous jitney run, but always with an element of danger, and some of the most conscientious men from the Army who have flown for us have taken it up as a matter of duty, because they were ordered to do it. That is not what they are in the game for.

Mr. HULL. That is the case where the Army flier, the man in the Army, flies the Post Office Department planes?

Mr. PRAEGER. Yes.

Mr. HULL. What I refer to more specifically is this: Here, let us say, is a man who is in the reserve. He is not in the Army. He wants to make a living and he takes a position with you. He would have a certain amount of knowledge about flying which would be a direct military asset, and he would be able to do much better in a shorter time, in case of an emergency, because of his experience as a flier for the Post Office Department than he would if he did not fly at all for two or three years.

Mr. PRAEGER. Absolutely; there would always be some form of military flying for which the air-mail experience would qualify him. Too steady flying tends to make the pilot stale and unfits him for a certain character of military work. But on the whole he would always be in a better position to render service in case of an emergency than a hurriedly trained pilot.

Mr. HULL. All of your fliers would really be able to go into the Army and fly the Army planes?

Mr. PRAEGER. As a layman I think they would, with many points of advantage over a man who had not been put through our work, which develops his resourcefulness and ingenuity by steady cross-country flying. I think they would have a great advantage in that respect.

Mr. HULL. In regard to designing, it was not my intention to entirely take away from the Post Office Department or the Army or the Navy the designing. It has been suggested that the bill is not clear now on that point, and an amendment has been suggested by Mr. Crowell.

Mr. JAMES. This is what Mr. Crowell suggests on line 24, page 3, section 3, after the words "manufacture of aircraft and aircraft parts":

Provided, however, That nothing herein contained shall be construed to prohibit the preparation by the War and Navy Departments of general plans and characteristics of the aviation mechanism, accessories, and equipment required for military or naval purposes.

Mr. PRAEGER. I had outlined an amendment about as follows—not exactly in these words: On line 20, after the word "as," insert the words "in the judgment of the Secretary of war, the Secretary of the Navy, and the Postmaster General will best meet the needs of the Government, to regulate and direct such activities in these respects as will promote and foster initiative and activity in the study and development of aeronautics in the manufacture of aircraft and aircraft parts."

That would require consultation with the War Department and with the Navy Department as to their needs before the director of aeronautics goes into production. Then I would add after the word "parts," on line 24, the last word in section 3 on page 3, substantially these words:

Provided, however, That nothing in this act shall be so construed as to prevent the War Department, the Navy Department, or the Post Office Department from designing or modifying equipment to meet the special needs of their separate activities or from modifying allotted equipment, with a view to greater safety and greater adaptation to their respective services.

That is substantially what the Secretary has in mind.

Mr. HULL. Yes. Of course, this bill provides for having one of the assistants from the Army, one from the Navy, and one from the commercial world, and my thought has been that you provide right there for a harmonious relation.

Mr. PRAEGER. You do if you will tie up the director of aeronautics with his assistants and say that the director of aeronautics, together with these three assistants, shall have exclusive control and jurisdiction over design, but the bill would make him absolute and independent even of the three assistant directors representing the three departments. If you will tie that up and say that the director.

together with the three assistants shall have exclusive jurisdiction, then you have each department sharing in the responsibility.

Mr. HULL. This is the point there. You have to have central control. This bill is framed with the idea, of course, of having the director a real director. But the officers assisting him would be men from the Army and from the Navy and from the Post Office Department.

Mr. PRAEGER. If you do that you will do injury to the development of aviation simply because you narrow that development down to one man, who has the final and exclusive say-so after conference with any engineers he may put in to guide him. If you narrow the development and design of types to one man, to that extent you are repressing development.

Mr. HULL. Somebody would have to be in control. My theory is, and it is the theory also of a great many very good men in the Army and the Navy, that the man who would be appointed director of aeronautics would be a very big, broad man, trying to make a success of his department. His tendency would be not to restrict or narrow anything down but, rather, to broaden it out.

Mr. PRAEGER. The best man in the world—if you restrict the development to that—no matter if you pick the best man you can find, you are narrowing it down to that one idea. This man is preparing equipment that the Secretary of War and the Secretary of the Navy must use. They are responsible for fighting results; they have a certain responsibility for the performance of that equipment. Certainly their wishes and their ideas ought to govern very largely in determining the types and character of the implements with which they must make good. They should design the types to meet their needs. Having done that, and having reached an agreement with the director of aeronautics, he should be left free to carry out the details.

Mr. FULLER. Then he is really a purchasing agent?

Mr. PRAEGER. He is more than that; he works out the details.

Mr. FULLER. You go to this man and say what you want. You do not want his advice, or, if you do want his advise, you want to be prepared to overrule it.

Mr. PRAEGER. This bill should be so amended that the Secretary of the Navy or the Secretary of War shall cooperate with this man in connection with obtaining the things they ought to have. It should be provided that the director of aeronautics, together with the representatives of these various departments, shall design the planes that they must use and that should insure the several departments obtaining equipment to fit their needs.

Mr. HULL. It was the idea that he would would do that, together with them; that if there was any question between them, he was higher than they, because he was the director and they were the assistants.

Mr. FULLER. I can see an objection to that at once—that you would be handicapping the Secretary of War as to what the War Department wanted. This man would be over the Secretary of War, as far as airplanes in the War Department were concerned, would he not?

Mr. PRAEGER. He would under this bill. The Secretary of War would have to make good with the designs over which the director

would have final and exclusive say. For instance, at the close of the war the Army gave us certain surplus war planes sometimes spoken of as the Pride of Dayton and sometimes as the "flaming coffin." A director of aeronautics clothed with final jurisdiction might want to continue this design and there would be no appeal from him. If such power existed in one man during the next three or four years the Army would get nowhere, the Navy would get nowhere, nor would anybody get anywhere. The director and his engineers may be well-meaning men, they may have good forces under them, but they have an individual viewpoint, and everything else could be subordinated to their views. The more viewpoints you can get at this stage of aviation the better and greater will be the development. That is what has made the automobile what it is, because the development of the automobile was unhampered. All the engineering firms of the country dealing with automobiles gave to it their best ideas.

We changed to a stronger plane, the De Haviland 4, from the type of machine it was at the close of the war. The original plane would break like a cigar-box in a bad landing, because it had at one end a 540-pound tank of gasoline supported only by the longerons. Between the gasoline tank and the engine rode the pilot. In a crash or rough landing the tank shot forward and the fusilage would break into kindling wood. Those machines were turned over to us with the proviso that no changes be made on those machines except with the consent of the technical branch of the Department of Military Aeronautics. I took that matter up with Secretary Baker, and he overruled that restriction, and took the position that when those machines passed out of the jurisdiction of the War Department it was not any longer the concern of the War Department what we did with them.

We had an aeronautical engineer in our own employ, and we had men who had been in design work in connection with airplanes, and we had men who were experienced aeronautical mechanics. They outlined the results we desired to obtain from these planes, and we simply said to the Standard Aircraft Co., to the Curtiss Co., and to the L. W. F., "Will you take this ship and have your engineering forces suggest ideas as to how it should be redesigned to meet the conditions in the Postal Service?"

The result was that we got the best engineers we could get at work on it and we had the consensus of the views of the engineering talent of three factories, and whatever change or improvement has been made in the De Haviland has been the result of the work of these various aeronautical engineers. It was not the work of one man, but it was the consensus of opinion of different engineers and airplane builders. If you hold future development down to a one-man viewpoint, you are going to have trouble.

Mr. HULL. That, of course, is provided for. There is no intention, after the plane is purchased, that this department of aeronautics, or the director of aeronautics shall have anything to do with the machine at all, because there is a provision in this bill that the various departments shall repair their own planes and make any improvements that they want to make in them. This department would have nothing to do with operations. That is one thing that I think is very essential, to divorce operations from this department, for the

present at least. Then if you insert the suggested amendment of Mr. Crowell, so each department shall design their own machines, if they want to, I do not see how there can be any objection to that.

Mr. JAMES. The effect of your amendment on line 20 would be that no plane would be produced by the Post Office Department unless the designs were first approved by the Postmaster General?

Mr. PRAEGER. That was my suggested amendment, on line 20, that the director of aeronautics should produce the plane that is approved by the department for which it was designed.

Mr. JAMES. He could not start to build any or buy unless the design was first approved by the Postmaster General.

Mr. PRAEGER. Or by the Secretary of War or the Navy Department.

Mr. JAMES. I am talking now about the Post Office Department.

Mr. PRAEGER. I really think the department should have a say so in the character of material with which it must make good.

Mr. HULL. I think you are absolutely right about that. There is no intention to deny them the right of approval of their own planes. There is no question but that that should be provided for.

Mr. JAMES. Unless there is an amendment in relation to that, a plane might be approved by the Post Office Department, and the director of aeronautics would not have to buy or build that plane. You have the privilege of designing, but it does not seem to me that the director of aeronautics has to buy or produce what you recommend. Is not that what you mean?

Mr. PRAEGER. Of course, I was looking at it the other way—that the Secretary of War or the Secretary of the Navy need not use that which he feels would not be of service to his department.

Mr. JAMES. You feel the same way about your department?

Mr. PRAEGER. Yes.

Mr. JAMES. Your idea is if certain planes were recommended by the director of aeronautics for your use, and you thought they ought not to be used, that the planes ought not to be purchased or built by your department, you would not be compelled to do that, and you think the same thing ought to be true in connection with the Army and the Navy?

Mr. FULLER. In a case where the department indicates what it wants and devotes itself to developing that kind of a machine, how can there be combination in that case; or how can we avoid having three departments doing the same experimental work which would e done in a good many instances?

Mr. JAMES. I understand they do not object to each of the three departments doing experimental work, but what the War Department objects to and what Mr. Praeger objects to is that the department of aeronautics may have the power to compel them to use a certain machine which they feel they should not use.

Mr. FULLER. I am talking about the fact that the Post Office Department, the War Department, and the Navy Department would be conducting their experiments independently, which means great duplication. Would it not be possible to have a single, combined engineering department where these experiments would be conducted to the satisfaction of the three departments concerned, where each of the departments would get what it wanted in one experimental department? Here is an art which is developing, changing, and im-

proving over night. They tell you that they build an airplane, but that in 90 days that airplane is of no use.

Mr. PRAEGER. As I understand it your idea would be that the Navy Department should not conduct an experimental shop at Norfolk, the War Department should not have an experimental station at McCook field, and that the Post Office Department should not have an experimental department at Newark, but that if McCook Field were the experimental field for the director of aeronautics, for instance, all experimentation would be done at that one field, and that they could develop designs for the Army and the Navy or the Post Office Department at that one experimental station?

Mr. FULLER. Yes.

Mr. PRAEGER. That could be done.

Mr. FULLER. My idea would be to have the engineering department absolutely at the service of these three departments. There does not seem to me that there is any inconsistency in that.

Mr. PRAEGER. That could be done.

Mr. FULLER. In that way you would not have the expense of three separate experimental stations, and you would avoid duplication of work and of expense.

Mr. JAMES. They could have one experimental station and each department could detail such men as were necessary to work at the experimental station and develop designs and types.

Mr. PRAEGER. We have just concluded an arrangement with the Army whereby we can make use of their shops. They have big shops with all facilities to do excellent work of that kind, and we have arranged with the Army whereby they are going to do a great deal of repair work, and we will simply detail some one there to see that it is done according to our needs. It will eliminate some men from our different fields; fewer employees will be needed there.

Mr. FULLER. I can imagine the difficulty we will have in getting an appropriation sufficient to conduct the experiments which are essential in one engineering department, and to get through an appropriation for a salary large enough to interest a man capable of being at the head of the department of aeronautics. I can not imagine any one of these men coming here to work for the Government who were here during war times. When we start out to get three men of that kind, I do not believe there are three of them in America.

Mr. JAMES. There would have to be four of them—the director of aeronautics himself and one assistant for each of the three departments.

Mr. HULL. I do not believe there will be any great difficulty in getting these men. Of course, the supposition is that the man from the Army and the man from the Navy will be detailed, and that those who are detailed from the Army and the Navy will be fliers in that branch of the service, and that they will know something of the needs of their particular departments. The theory is that they will know the needs.

It seems to me that section 3 of House bill 12134 pretty nearly covers the whole proposition. Section 3 says:

That the director of aeronautics be, and he hereby is, vested with complete and exclusive jurisdiction and control over the production, procurement, purchase, manufacture, designing, and development of aircraft, equipment, aircraft engines, or aircraft parts of any description or nature, and it shall be

the duty to consider the special and respective needs and requirements of each and every department or agency of the Government, and to design, manufacture, purchase, assemble, produce, and provide such type of aircraft as will most meet the needs of the Government, to regulate such activities in these respects as will promote and foster initiative and activity in the study and development of aeronautics in the manufacture of aircraft and aircraft parts.

The suggested amendment of Mr. Crowell would provide that if they wanted to they could, of course, design anything they wanted themselves. There would not be any idea of confining it to any one department. But still, as Mr. Fuller says, you have got to economize by having one engineering or experimental plant, and the advantage of this plan is that you could get it in one place. If anybody has a good idea, and they can not get these people to consider it, and they think it ought to be considered, they can go ahead and design it and say, "Here is something good; let us go ahead and make some of these."

Mr. FULLER. If you had one first-class engineering department it would seem as if the experiments could be worked out there.

Mr. JAMES. The amendment proposed by Mr. Crowell provides:

That nothing herein contained shall be construed to prohibit the preparation by the War and Navy Departments of general plans and characteristics of the aviation mechanisms, accessories, and equipment required for military or naval purposes.

Mr. FULLER. I have in mind that each of these departments may be conducting experimental work of the same sort and it would be wicked to have that done in three different places. It is very expensive work. I know a concern engaged in the manufacture of gas engines which spent $600,000 for some experiments with rotary valves, and after they had spent that much money nothing came of it. That was in connection with a gas engine, which is supposed to be pretty well developed. When we got into this proposition of airplane and airplane engines, that is all new. We spent a billion and a half dollars on airplanes and engines and have nothing to show for it, and it does seem essential that we should proceed hereafter rather cautiously in our expenditures.

Mr. HULL. The difficulties that you will have to overcome are practically the same in all branches. It is a question of the navigation of the air, and resistance in one case is the same as in another.

Of course, there are some special problems that the Army and the Navy will have. However, those are not really in the matter of flying, but in the landing.

Mr. FULLER. There would be no objection, I take it, in developing the service in these different branches, to bringing the recommendations under the review of the head of the department of aeronautics, so that he might at least be given the opportunity of making suggestions and criticisms.

I think one of the great difficulties we got into in our expenditures during the war came out of the fact that it was said we were going to have an all-American plane. All the experience of the Allies with airplanes, all the experience of other countries all over the world in making airplanes, did not mean anything to us. We went down to a hotel and designed it, and then we built it.

Mr. PRAEGER. And they got an English plane at that. In regard to the proposed amendment of Assistant Secretary Crowell: He sees

the subject only from the military side. I think that ought to be broadened so that it would include the War Department, the Navy Department, the Post Office Department, or other Government departments.

Mr. JAMES. The objection I see to the proviso to section 3 is that the director of aeronautics can insist, for instance, on manufacturing the de Haviland 4 machines that were used in the Army by fliers, and the fliers themselves have the idea that the machine is a man-killer. And yet, under that provision in section 3, unless there is a modification of it the director of aeronautics could go ahead and manufacture the de Haviland 4 machine by the hundreds and the fliers would have to use those machines, because the provision says:

> That the director of aeronautics be, and he hereby is, vested with complete and exclusive jurisdiction and control over the production, procurement, purchase, manufacture, designing, and development of aircraft, aircraft equipment, aircraft engines, or aircraft parts of any description or nature.

It seems to me there ought to be a proviso in that section by which no machine can be manufactured for use in the Army or the Navy or the Post Office Department, when the men who are going to operate those machines are absolutely convinced that they will take their lives in their hands when they go up in those machines. Is not that a fair proposition?

Mr. PRAEGER. I think it is.

Mr. FULLER. It is your recommendation that the design of the machine be approved by the head of the department using it?

Mr. PRAEGER. Yes.

Mr. FULLER. It seems to me that is absolutely essential.

Mr. HULL. There could be no objection to that, it seems to me.

Mr. PRAEGER. Coming back now to section 2, the first part of that section provides:

> That there shall be three assistant directors of aeronautics, who shall be appointed by the President, and who shall be subordinate to and under the direction and authority of the director of aeronautics, and whose tenure of office shall be the same as the director of aeronautics.

If the bill would carry somewhere a specific statement that it shall be no part of the duty of the department of aeronautics to operate this equipment for these different departments, then this provision in section 2 is all right, except that I would like to suggest a change in the wording, beginning on line 2, page 3, "That one assistant director of aeronautics shall be appointed from civilian life," changing that to read, "That one assistant director of aeronautics shall be appointed from the Post Office Department," etc., because when you get down to the end of section 2 you find that the flying operations of other civilian departments are taken care of in section 6, which says:

> That the director of aeronautics may turn over equipment to any of the other departments.

If it is left as it is, that this man may perform "any other duty" relative to aircraft in the Post Office Department, that clearly means operations, if he desires to assume that authority. We would have no objection to that if such a man be detailed from the Post Office Department, because it would be the head of the air mail service whom we would detail to operate that service.

Mr. HULL. I do not believe you would want to connect up operations at all. I am inclined to think it is not in there at all, but to make it clear we should say, "Not including operations."

Mr. PRAEGER. If you will say that, then that will be satisfactory. If you say, "Not including operations," that will make the meaning clear.

Mr. FULLER. It makes the director of aeronautics really the head of engineering and production; that is about all, is it not?

Mr. PRAEGER. Yes.

Mr. HULL. It gives him the entire control in the matter of framing rules and regulations and licensing of all pilots. That is one big thing. It also gives him authority in the matter of the consolidation of all the landing fields. That is another big feature.

For instance, take the situation here in the city of Washington. We have three fields here. Under the provisions of this bill the director of aeronautics would take these three fields over and would then allot one of those fields and dispose of the other two. He would allot to the Army or the Navy or the Post Office Department, whichever he believed was the best able to function here, and they would take that field over and control it under such rules and regulations so as to allow the other departments to use the field. The theory is that the director and all of the assistants would agree as to what would be the right thing to do.

Mr. FULLER. If you agree that the head of the Post Office Department should O. K. the design of the airplane to be used in that department, why should he not O. K. the landing field?

Mr. HULL. I do not imagine that an operating department would have any great amount of trouble.

Mr. PRAEGER. I do not think that anything except the design of the plane would give us any trouble when we have on the board or in the department of aeronautics a representative who would really represent our department. I do not think there would be any trouble in the matter of the location and management of the landing fields. The vital thing is the operation of the airplane itself.

Mr. JAMES. Would you provide in section 2 that the assistant directors from the Army and the Navy should be fliers?

Mr. PRAEGER. I think the trouble with military aviation has been that the fliers have not been strongly enough represented in the working out of the policies for aviation. I am not a military man, but it would seem reasonable that the men who are building up military aviation should be men who are actual fliers, or men who had been actual fliers.

The CHAIRMAN. Mr. Crowell also suggests striking out the words, "and directed" in line 2 of section 4; and also striking out in line 14, of section 5, the word "and," and add after the word "equipment" the words "and helium gas."

Mr. Crowell also suggests adding the following as a new section, immediately after section 5:

There is hereby transferred to the director of aeronautics, and he shall forthwith assume control and jurisdiction thereof, all flying and training fields and stations now under the control of or operated by, any other department of the Government, together with all buildings and equipment necessary for the proper operation thereof, and the director of aeronautics is hereby vested with complete and exclusive jurisdiction and control of all flying training for aviators of all departments of the Government, except such specialized training as may be required by or for the aviation units of the War and Navy Departments.

Then we have another amendment suggested by Mr. Crowell. He would add another new section to the bill covering the development, construction, and operation of lighter-than-air craft, as follows:

The director of aeronautics is hereby vested with complete and exclusive jurisdiction over the production, procurement, purchase, manufacture, designing, development, and operation of all lighter-than-air craft; and there is hereby transferred to the director of aeronautics all equipment and matériel now in the custody of any other department of the Government; and there is hereby transferred to the director of aeronautics the entire civilian personnel of each and every department and agency of the Government at present exclusively assigned to or engaged upon work in or in connection with the operation of such lighter-than-air craft; and the director of aeronautics is hereby authorized to employ such other persons as may be necessary for the operation of such lighter-than-air craft.

What do you think about that amendment?

Mr. PRAEGER. What does it seek to do?

Mr. HULL. That simply seeks to put the balloon service under the director of aeronautics. I would have no objection to that, and it might be advisable, but the bill contemplates that. I do not see how it can be misinterpreted. You will find the provision I refer to on page 4. When you say aircraft, you practically include that. On page 4 it is provided:

And by such other means as he shall deem best suited to develop the production of heavier and lighter than air aeronautical material and to encourage and foster such development, * * *.

Mr. JAMES. It seems to me you could take care of that by saying:

Development of aircraft, aircraft equipment, aircraft engines, or aircraft parts of any description or nature, including lighter-than-air craft.

Mr. HULL. When you say "aircraft," I think you include balloons.

Mr. JAMES. I think it would be better to word it that way than to put in an additional section.

Mr. Crowell also has another suggested amendment, in section 2, line 11, page 2, strike out the word "President," and insert in lieu thereof the words "director of aeronautics;" and also in line 14 on the same page, to substitute a comma for the semicolon appearing after the word "aeronautics," and insert after the comma the words "unless sooner removed by the director of aeronautics."

Mr. HULL. That is to make these assistant directors work in harmony with the director, so that if the director found an assistant in there who was trying to ditch his entire proposition, the director could let him go.

Mr. PRAEGER. I should imagine that would have to be done in order to keep somebody from putting a monkey wrench into the machinery.

Mr. HULL. I do not imagine the case would ever happen, but it might be well to guard against such a contingency.

Mr. FULLER. What does the bill do when you go beyond making this man the head of engineering and production? There is a consolidation of fields. How much further does it go?

Mr. HULL. He controls all the air routes, and all the licensing. That is one of the most important things to be considered, it seems to me, to get some rules and regulations by which men are to operate in the air. You have got to have some rules and regulations to govern the fellows who go up in the air and who take people up in these machines as passengers. There is no law now, as I understand it, to regulate them.

Mr. FULLER. It strikes me that that is quite apart from conducting the Government's business economically.

Mr. PRAEGER. Some one should do it, and the suggestion has been made that it be done under the Secretary of Commerce, and a bill has been prepared to that effect. Then you would have one separate organization in the Department of Commerce, which does not know a thing about aviation, where they would have to build up an aviation section to enforce the rules, and it seems to me it might as well be absorbed in a department of aeronautics. These boys who have been jitneying at a dollar-a-minute this year have some of their ships tied up now with baled hay wire and they are going to fly next year. We have had cases reported to us of fellows who wanted to fly the mail, and we have looked into their history to find out how they started.

There was one Greek who put in one afternoon learning the controls, and the next morning the fellow who was teaching him said, "Do not get in there and taxi that machine; I will show you how to do that this afternoon." After the instructor went away, that fellow took the machine out and flew around in it, and finally he set it down all right. But ordinarily when a greenhorn gets up he does not know how to get the machine down. So you have got to have regulations for the benefit of the innocent bystanders underneath, and not only for the people who go up in the machine.

Mr. HULL. There is another feature. Of course, every time one of these men goes up in the air, if one of your men flying a Post Office Department plane over a certain route, those other fellows are liable to run into him. They do not know anything about the routes; they are wholly at sea.

Mr. PRAEGER. That is true.

Mr. FULLER. There is no question about the need of having rules and regulations.

Mr. PRAEGER. This organization, with all the facilities it would have at its command would be better fitted than the Department of Commerce or any other department to do that work because any other department would have to employ a line of specialists to pass on these questions.

Mr. HULL. That is why I think it would be a good idea to have this board made up of actual flyers, because they know more about the details of flying than anybody else. I do not know whether it is best to make a hard and fast rule about that. It seems to me when you give the President authority, if it was at all possible to find a man of that kind he would do it, without being compelled to do it. It seems almost like insulting the President to say you have to appoint a certain kind of man. Of course, the man ought to be a flyer, if it is possible to get one.

Mr. PRAEGER. I think it is contemplated that these representatives of the War Department and the Navy Department must be detailed by the Secretary of War and the Secretary of the Navy. I think we ought to take the precaution not to have an Artillery or an Infantry officer detailed as the representative of the War Department. That would be entirely possible. It has been done in the past.

Mr. JAMES. Suppose the bill provides that the men so detailed shall be detailed from the commissioned flying officers of the Army and the Navy?

Mr. PRAEGER. Why not say from officers who have had a flying status?

Mr. JAMES. Section 2 provides. "That one assistant director of aeronautics shall be detailed from the commissioned officers of the War Department," and "that one assistant director of aeronautics shall be detailed from the commissioned officers of the Navy Department."

Mr. PRAEGER. You might say, "who is a flying officer," or, "an officer who has had flying status." I have no one in a supervisory position in the air mail service who has not flown or is not a flier. Take, for instance, the superintendent of maintenance, who deals with the engine, equipment, and parts. He was the adjutant of the West Virginia unit who went to France and the chief of flying and experimentation, who was a flier at Bolling Field. The head of the service is Maj. Lent, who was a flying officer. I would not pick anybody for any given work unless he knows the business all the way through. I think it would be well to insert a provision that the assistant directors should have flying experience. Of course, the presumption is that the head of the department would do that, but we know that that has not always been the case.

Mr. JAMES. Would you say that it is necessary to report out a bill of this kind at this session of Congress?

Mr. PRAEGER. I think it would help to stabilize and prevent a further disruption of the air industry at the present time if we could get immediate action. I feel that this sort of a provision would stabilize all aviation, and the quicker we can get it the better.

I realize, of course, that this is an abnormal year for legislation, and perhaps we may be able to do more with it next year after these issues following the war are out of the way. But if such a bill could be gotten through it would be a good thing to do it now.

Mr. FULLER. I would like to ask how the Post Office Department can afford to carry mail by airplane?

Mr. PRAEGER. I am glad you asked me that question. There has been ringing in my ears the statement made on the floor of the House, about this socalled plaything of ours, flying through the country "with a shirt-tail full of mail." If you realize that we have to put on 60-foot cars that cost us about 67 or 68 cents a round-trip mile; that we have to put in those cars anywhere from 6 to 9 men to distribute the mail, and that you have to do that for "a shirt-tail full of mail," or for a trunk full of mail, and that you must get into Washington or Philadelphia before business closes, or get into New York before the close of clearing-house hours, and that one De Haviland airplane will carry, not the amount of mail that the 60-foot car can carry, but as much as makes it necessary for us to put the car on, then you can realize, considering the cost of operating that car and also considering what it costs to operate the airplane, that we can save money.

Take the route between New York and Chicago, for instance. A 1,500-pound airplane, that is, a Martin plane that would carry 1,500

pounds of mail, has enabled us to take off $486,000 worth of railway service from the New York Central and Pennsylvania railroads, including perhaps $80,000 worth of clerical service. If I were ordered to stop the air mail service to-night I would have to go tomorrow morning and authorize the reinstatement of more than $500,000 worth of that kind of service. One plane carrying 1,500 pounds of mail enables us to retire three cars.

This is mail that must be worked up en route to connect with certain carrier deliveries. The commerce of a big city is so urgent that we must do that. We put $81,000 worth of service on the Federal Express, and that advanced the delivery of mail from a second morning to a first morning delivery. That is only a small part of the mail; it is really banking and business mail, but it gets in in time for the clearing house.

We do the same thing on the Pennsylvania Limited. That costs over $100,000 a year. That mail on the Pennsylvania Limited is carried in the little 15-foot compartment in the baggage end attached to the smoker. We are able in this way to get the mail to business people before the day is over, to meet business needs. The clamor for it is such that we have to put it on.

A little training plane would carry all the mail that makes it necessary for us to put on that service. That is the only way we can figure out the saving.

Mr. FULLER. I can see where there would be a clamor for it, but I can not understand how the Government can afford to give this special service.

Let us take the airplane service between Washington and New York: What is the revenue?

Mr. PRAEGER. The only way to ascertain the revenue is this: Say a machine carries 14,000 letters; the revenue would be at the rate of 2 cents a letter, or perhaps a little bit over that. But you could carry that cheaper by train if you are just going to transport it but not try to transport it in a way to make city-carrier connections. The revenue would be 14,000 multiplied by 2 cents.

Mr. FULLER. How much does it cost to run that airplane to New York?

Mr. PRAEGER. You are going at it wrong. I would rather tell you how much it costs to make the distribution on the train. I will tell you what it costs to carry it to New York. I think that is $120,000 this year. That includes depreciation and interest. It is between $120,000 and $128,000. That would be an outside figure.

Mr. FULLER. That is, to New York for a year?

Mr. PRAEGER. That is the round trip between Washington and New York.

Mr. HULL. Does that include the automobiles you have to utilize?

Mr. PRAEGER. Yes; it does. It includes the upkeep for trucks and motor cycles.

Mr. FULLER. How many trips?

Mr. PRAEGER. That is one round trip a day, or 307 round trips in the year.

Mr. FULLER. Three hundred and seven round trips in one year?

Mr. PRAEGER. Three hundred and seven round trips in one year.

Mr. FULLER. Does the $128,000 include everything?

Mr. PRAEGER. It includes the depreciation and interest at 6 per cent on the planes actually flying and on the tools and equipment on the ground.

Mr. FULLER. Does that include depreciation and interest on the planes held in reserve?

Mr. PRAEGER. Absolutely, not; because we have a warehouse full of those at Newark, that are not being used, but it includes all those on the field, not all of our equipment.

Mr. FULLER. In making provision for this service in the years to come you would have to have some planes in reserve?

Mr. PRAEGER. Of course. Here is what we figure on. We figure for each plane in the air we should have about four planes in reserve. We actually have a greater reserve, but if we had to buy the equipment we would not have as big a reserve as we have now. We have more than 100 planes turned over to us by the Army and the Navy in the warehouses. That amount includes a 6 per cent interest on the planes in the field, in the actual flying service, and the tools and trucks.

Mr. JAMES. How much more does it cost you this way than if you used the trains?

Mr. PRAEGER. The trains with the clerical hire, are costing us between $126,000 and $128,000 a year. That is the 60-foot car which this plane has displaced. If we stopped this plane service that is what we would have to put on.

Mr. JAMES. That means that you figure it is not costing you any more for the airplane service than it would have cost you otherwise?

Mr. PRAEGER. Absolutely. If Congress were to say you have $60,000,000 to carry the mails, we can say if you authorize out of that $3,000,000 you will not have to increase that $60,000,000 a cent because we can carry on the service out of that. The service between New York and Chicago for the year will cost approximately $361,000; that is, counting 307 round trips for the year, and the saving on space and clerical hire is $486,000; that is, if we stopped the air mail service for a year, that is the amount we would have to expend for railway space and clerical hire.

Mr. JAMES. What is there to this story in which it is claimed that if a train leaves here half an hour after an airplane leaves, the train will get to New York about an hour or two hours before the airplane; that it takes longer to send the mail by airplane than it does by train?

Mr. PRAEGER. No; it does not; because no man who knows anything about the facts ever said that. It is a bare falsehood.

Mr. JAMES. I have heard it several times, and I could not see how it could possibly be so. They claim that one reason is because of the landing at New York and because of the fact that you have to use automobiles to carry the mail from the landing field to the post office, and they say that a letter will be delivered quicker the other way.

Mr. PRAEGER. I will show you just how the service works. We leave Newark Field; the mail is carried across from the post office to Newark Field in automobiles, and it leaves at 8.40 o'clock in the morning.

Mr. HULL. How long does it take to get from the post office to the field?

Mr. PRAEGER. I think it takes 40 minutes to get it from the Pennsylvania Station to Newark, and from Newark to the field, that is, to Heller Field. We do not fly to and from the Belmont Field any more.

Mr. JAMES. I think it would be a good thing if you put in the record a statement as to how long it took for mail to go by airplane from New York to Washington and how long it takes by train.

Mr. PRAEGER. The mail leaves the New York City post office at the same time it would have gone out on the train, leaving New York at 8.08 in the morning. We bring it in to Washington and at College Park at 11.15 when the run is normal. If the machine meets a head wind it may get in at 12 o'clock; if it meets a very severe, heavy wind, or something happens that will hold them up, the machine will get in by 1 or quarter past 1 o'clock. It takes 25 minutes to get from College Park into the floor of the city post office.

In over 50 per cent of the time, as an average run, the air mail arrives at the field at College Park at around 11 or 11.15 o'clock, and is in the Washington city post office in 25 minutes, and Postmaster Chance's carriers are out on the street at 12.20 o'clock with that mail from New York.

The mail carried from New York to Washington is principally New England mail. It reaches New York, some of it, at 6.50 and the rest of it at 7.50 o'clock in the morning. If it were carried by train it would be transferred from the Grand Central Station to the Pennsylvania Station for the train leaving the Pennsylvania Station at 8.08 in the morning, and that train is due to arrive here at 1.45 o'clock in the afternoon. During the last year that mail by train on 26 per cent of the days missed the carriers because of its being late.

Going to New York the mail plane starts at 9.30 o'clock in the morning. The train which formerly carried this mail left a little after 8 o'clock. It was a slow train and got into New York about 2 o'clock. We run at the rate of 80 miles an hour on an average in the air, and the fastest train between here and New York carrying mails will probably run on an average of about 40 miles an hour.

Mr. FULLER. Will you tell me how many planes were used last year? I read about the profits of the post office. If the claim is made that the post office is run profitably by a Republican administration there is always a Democratic Postmaster General who can prove that those figures are fallacious, and it seems to me the same thing is true the other way around, too. Then I hear that they allow no charge for depreciation of the various post offices around the country, which any ordinary merchant would include right away to the extent of, say, 5 or 10 per cent.

Mr. PRAEGER. I think I can answer you on that matter by showing you what we figure in our costs.

Mr. FULLER. I was leading up to this question. I wanted to ask you how many planes were used last year.

Mr. PRAEGER. To make the 307 round trips from New York to Washington, my recollection is that we counted interest on $118,000 at 6 per cent. The planes did not cost us anything, but we put in an amount for interest and depreciation at the rate the Army said it cost to build the machines.

Mr. FULLER. That is figuring what price for an airplane?

Mr. PRAEGER. I think the JN-4-H were put in at about $6,000, and I think the De Haviland was rated at about $10,000.

Mr. FULLER. Do I understand you to say that those prices, $6,000 and $10,000, are what the Government paid for those machines, or the valuation they made to the department?

Mr. PRAEGER. That is the cost to build them in war times.

Mr. FULLER. Then you based the 6 per cent for depreciation on those valuations?

Mr. PRAEGER. The interest and depreciation was calculated on $6,000 per plane, which was the cost of a JN-4-H, because that is what we used nearly altogether the first year, except for a few months.

Mr. FULLER. Then if you took the number of machines you had you could arrive at that by dividing the $118,000 by, say, $8,000, and that would indicate the number of machines you had, would it not?

Mr. PRAEGER. I think the number of machines we had would probably be 14 or 15 planes during the year.

Mr. FULLER. You would say this figure was arrived at on a basis of depreciation of 6 per cent on 15 planes?

Mr. PRAEGER. No; that is the interest and on top of that depreciation of 33⅓ per cent. That 6 per cent is the interest on the investment. Then we have depreciation of 33⅓ per cent, and that is counted on the plane only while it is actually flying, only while it is actually in service, because there is no depreciation, no wear and tear on a plane that is kept inside of a hangar.

Mr. FULLER. That is directly contrary to what the experts testify to us.

Mr. PRAEGER. I am willing to stand on that. Do they mean to say there is some depreciation on a plane standing in a hangar, the same as in the air?

Mr. FULLER. I think common sense would show you it is not the same as in the air; but I think you can not say there is not any depreciation when it is not in use.

Mr. PRAEGER. If there is any it is negligible.

Mr. FULLER. The Army officer in charge of airplanes located in Paris during the war, Gen. Patrick, made the statement that airplanes would be worth practically nothing 90 days after they were built.

Mr. PRAEGER. That may have been true on the French front. Let me tell you what we have done. We flew the same plane with the same engine for a year; that is, it was the same plane with the same engine in it at the end of the year that had been used at the beginning of the year, and about a month or so ago that same plane which had run for a year was taken out again with the same engine and sent on to New York with the mail. Of course, the life of an airplane in peace-time conditions, with the care you can give it under such conditions, is an altogether different proposition from the life of a plane in time of war.

Mr. FULLER. Then you do not think a charge for depreciation based on the actual time the machines were not in use would be fair?

Mr. PRAEGER. I do.

Mr. FULLER. Then, you would say you could take 15 planes devoted to that service and simply charge depreciation on one?

Mr. PRAEGER. If you only fly 1 of the 15.

Mr. FULLER. How many would be in service?

Mr. PRAEGER. That depends upon the location of the route.

Mr. FULLER. I am speaking of the trip from Washington to New York. That is the one on which you said you had 15 planes in use during the year.

Mr. PRAEGER. There would be two machines in the air every day.

Mr. FULLER. Then, the depreciation would be charged on 2, and 13 would be held in reserve?

Mr. PRAEGER. Yes, sir.

Mr. FULLER. Is that a good business proposition, from the standpoint of sound bookkeeping?

Mr. PRAEGER. It is, absolutely; you know that.

Mr. FULLER. I do not know that it is; I do not think it is. It does not sound good to me.

Mr. PRAEGER. When we send a ship out in the morning, one ship flies and two others are made ready at the hangar, tuned up, and turned over and made ready to go in case one of the others develops trouble and can not go. The machine that is held there in reserve is charged with service during the hour while it is standing, waiting to go, because it is consuming gas. It is charged with depreciation during that time. We can base our depreciation charge either on the hour of service or the mile of service. Nearly all truck depreciation now is based on a mile basis and not on the time when the truck is idle in the garage. Nearly every big garage or big truck user bases his depreciation on so much on a mileage basis. He will figure a car of one type is good for 125,000 miles.

Mr. FULLER. But the truck, practically speaking, is, in a way, perfected; but here the development of the art is so rapid that the machine becomes out of date in a very short while.

Mr. PRAEGER. It does not become useless. If we have a crack on a run we figure that as loss. We charge depreciation; perhaps we will save the wings, but we will lose the handling gear and the fuselage. There would be the propellor and the fuselage. What is not salvageable on the airplane is written off on the books and the loss charged up as operation cost, and we add on top of that the cost of the replacement parts used in rebuilding the plane. Everything is charged up against the month's operations.

So you have the total cost when you charge the full value of replacement, the labor, and then, on top of that, the loss through accident. You can do this because every part of the plane is interchangeable. It may not be the same machine at the end of nine months that you started out with because so much of it has been replacement.

Mr. FULLER. Still, you would expect the items to be separate as between depreciation and repairs; there is no confusion between those two accounts.

Mr. PRAEGER. No, sir. Then, if on top of that we should charge depreciation we would have a double charge, for we would add depreciation on top of the loss and replacements.

Mr. FULLER. You carry also, besides your interest charge, a depreciation account, as 33⅓ per cent, and a repair account?

Mr. PRAEGER. Yes, sir; and a replacement account on top of that. We charge off the actual loss, notwithstanding that we have already charged it off in a measure in depreciation. The cost is divided

into 12 items. First, there is the general overhead on a per mile basis. That overhead includes a portion of my time and a portion of any clerk's time on another roll, charging to this account the time he is assigned to this work. That takes in all the clerical help here, it takes in a certain telegraph and traveling expense and things like that. It takes in everything that is incidental.

Then I have rent, light, heat, telephone, and water. That is on the fields. Then I have 6 per cent interest on the planes and the equipment. Then there is a depreciation account of 33⅓ per cent on planes and 10 per cent on the fixed permanent improvement, like roadways and buildings.

Then I have a field force and the straight salaries of the pilots and the plane crews; gasoline at so much per gallon and lubricating oil, and then I have the replacement of parts. That is established straight through at 20 per cent of the value of the plane in a year.

Mr. FULLER. In the account for the replacement of parts, does that include both parts and labor?

Mr. PRAEGER. Purely the parts, because the entire field force of mechanics is included.

Then there are miscellaneous field expenses of all conceivable kinds. Then there is also wireless maintenance, and then on top of that there is a provision for emergencies. That emergency fund is to take care of forced landings and expenses in connection with that. That is carried at $1,000 per plane in use per month.

I do not think we are far apart from the best usage in charging depreciation on equipment only while it is in use. It is the practice in the automobile industry, which has been standardized, to charge depreciation on a mileage basis on the theory that there is no depreciation, or only a negligible depreciation on a truck, while it is in the hangar. If you take the French system for charging depreciation you will find that they carry it to extremes, with the result that it comes to the point where because of their replacements they lose efficiency and they have old engines and equipment that no longer meet the requirements or can compete with new equipment.

Mr. FULLER. Tell me this concerning the matter of figuring depreciation. Suppose you had 15 planes assigned to the Washington-New York service. How long do you think those 15 planes would satisfy you? Do you not think they would be out of date in a year?

Mr. PRAEGER. No. I will tell you why. During the war the Army had available a lot of small training planes. The bigger planes with the Liberty engines were for advance training, and the Liberty engines were being sent to France. The only other planes we could get were some small planes that the Standard Aircraft Corporation had carrying only 200 pounds of mail.

The Army at the time got a few of the Curtiss R-4 planes released for the mail service, five or six. That was 20 months ago, and those R-4 planes to-day are our standard equipment between here and New York. As long as a 450-pound carrying capacity can replace a distributing mail car, that type of plane will serve our purpose. It is just a drayage question with us. It is not as if we were engaged in work like that of the Army and the Navy, and

had to get the most up-to-date machine to meet competition and a type can become obsolete over night. It is not comparable with a commercial venture where you have keen competition. We realize that we will, perhaps, some day get other machines much more economical to operate than the R-4, but probably not for some years.

Mr. FULLER. It is a matter of wonder to the layman as to whether the Government can utilize this method of service in delivery when a merchant could not.

Mr. PRAEGER. There is only one commodity I know of in this world which you can carry in an airplane for less than you can carry by any other means, and that is this particular kind of mail. You would have to distribute it on a train with a battery of distributors and have to pay a lot of money for the space occupied by racks.

Mr. FULLER. The Post Office Department does not make any attempt to put on an extra charge for this airplane mail service?

Mr. PRAEGER. No, sir; it is simply to expedite the mail. The mail from Boston had practically always missed connections, so that you would never get that mail delivered by carriers in Washington until the second morning, whereas now we get it to you either on the 12.20 delivery or the 1.30 delivery of the first day.

Mr. FULLER. How do you distinguish as between mail that demands the aerial service and that which it will be just as satisfactory to be delivered in two days as in one?

Mr. PRAEGER. By the complaints of the communities. Boston raises a great deal of uproar about it taking two days for its night mail to get to the public in Washington, so we use this service for the business mail. That is where we tried to relieve the situation. We could pick out almost a dozen lines where we could save money by airplane over train service.

Mr. FULLER. There are no instances where you do both; that is, send mail by rail and airplane, too?

Mr. PRAEGER. Not the same class of mail; no. We run the airplane service in such a way that it enables us, when a car reaches Cleveland, to take the mail out of that car and put it in the airplane and discontinue the car from Cleveland to New York, and we can do the same thing on the westbound trip. Wherever you have two or three working cars between big centers, and you have a distance, such as 500 miles, you can take off enough distributing space to more than pay for the cost of the aircraft. If you have only one such car you might be able to save half a car out of a 60-foot car, but that would not entirely pay the airplane cost. You can not carry by airplane any other mail, except just such letter mail as I have described, except at greater cost than by railroad. And there are about a dozen routes in the whole country on which you can save money by airplane over railroad transportation.

(Thereupon, the subcommittee adjourned to meet tomorrow, Friday, February 13, 1920, at 10.30 o'clock a. m.)

SUBCOMMITTEE ON AVIATION OF THE
COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Friday, February 13, 1920.

The subcommittee met at 10.30 o'clock a. m., Hon. W. Frank James (chairman) presiding.

Mr. JAMES. The subcommittee has met this morning to hear representatives of the Navy Department in reference to the bills introduced for the creation of a Department of Aeronautics, H. R. 11206, introduced by Mr. Morin, and H. R. 12134, introduced by Mr. Hull, of Iowa.

Admiral Taylor and Capt. Craven are here. We will hear the admiral first.

STATEMENTS OF REAR ADMIRAL DAVID W. TAYLOR, CHIEF BUREAU OF CONSTRUCTION AND REPAIR, AND CAPT. THOMAS T. CRAVEN, DIRECTOR OF AVIATION, NAVY DEPARTMENT.

Admiral TAYLOR. Mr. Chairman, I feel—of course I am expressing simply my personal opinion; I am not speaking for the Secretary of the Navy—but I feel that the primary need of legislation as regards aviation is to provide some Federal agency which shall control the Federal activities necessary in dealing with civilian or commercial aviation. There is need, I believe, for Federal licensing of aviators, for some Federal provision with regard to routes, landing fields, and matters of that kind. That is a matter which has been entirely neglected, so far as regards Federal legislation. The States are beginning to legislate, and unless something is done very soon we will have 48 varieties of legislation dealing with these matters.

I understand the Federal Government can not necessarily control the States, but I believe if the Federal Government takes the lead there will be very little confusion and clashing between Federal legislation and State legislation.

I feel that it is distinctly objectionable and wrong for either the Army or the Navy to attempt to control, regulate, or direct civil or commercial aviation. I think they should restrict themselves to their own spheres, that is, to dealing with aviation for the Army and the Navy distinctly. I testified before Mr. LaGuardia's subcommittee that I believed a united air service would be a very extravagant and wasteful method of providing and operating aviation necessary for the Army and the Navy.

Mr. JAMES. Whom would you have given control of what you have just mentioned; that is, the licensing of pilots and things of that kind?

Admiral TAYLOR. I am a great believer in judging the future by the past, and I would have that under the control of a suitable bureau established in the Department of Commerce, just as the Department of Commerce now regulates all such matters with regard to the navigation of vessels.

Mr. JAMES. I should imagine you would not go any further than the provisions of section 4, on page 4, of H. R. 12134, in which it

is provided that the director of aeronautics is authorized and directed—

:o establish and promulgate rules and regulations governing navigation of the ıir, including the establishment of aerial routes for international, interstate, ınd intrastate flying, the issuance of aviators' and aeronauts' licenses to pilots, :he issuance of licenses for airships, airplanes, hydroplanes, seaplanes, balloons, lirigibles, and any and all kinds of aircraft, and to establish and promulgate ·ules and regulations governing the use of Government-established landing lelds.

Admiral TAYLOR. I think something of that kind is the most pressing need at the present time, so far as legislation is concerned.

I believe there has been a bill prepared to carry into effect the international convention on aviation. Capt. Craven can tell you about that. There are certain provisions in connection with the treaty of peace dealing with aviation which presumably will require legislation.

Mr. JAMES. You are against anything that will interfere with the Army buying its own planes and the Navy buying its own planes?

Admiral TAYLOR. I can only speak for the Navy; but I believe the aviation of the Navy can be best handled by having its control by the Navy. At the present time there is a coordinating board made up of Army and Navy officers whose function it is—it does not involve any serious expense, because there are comparatively few matters to be dealt with—a board made up of officers acquainted with aviation, and they pass upon all estimates for either service before the estimates are submitted to the heads of the War Department or the Navy Department and to Congress, to make sure that there is no avoidable duplication on the part of either service.

Mr. JAMES. How much money did you spend in the Navy last year for airplanes?

Admiral TAYLOR. The appropriation was $25,000,000.

Mr. JAMES. Did you spend it all?

Mr. TAYLOR. We will, probably, not spend quite all of it, because some of it was lighter than air, which we will not be able to spend during this fiscal year.

Mr. JAMES. How much of your appropriation will you use for the purchase of airplanes ?

Admiral TAYLOR. I will have to put that in the record. I think we had better insert the provision contained in the naval appropriation bill of last year, which provided for that appropriation. It was not a lump-sum appropriation in the ordinary sense. A certain amount was allotted for the purpose of procuring aircraft, a certain amount for heavier than air, and a certain amount for lighter than air, and certain amounts for other purposes connected with aviation. It was divided into detail, and it is being spent closely along those lines.

Mr. JAMES. You will put into the record the provision of the naval appropriation bill which you referred to and also the amount which you have spent?

Admiral TAYLOR. I will insert that data.

(The matter referred to is as follows:)

[Taken from the naval appropriation bill, 1920.]

Aviation, Navy: For aviation, to be expended under the direction of the Secretary of the Navy for procuring, producing, constructing, operating, pre-

serving, storing, and handling aircraft, establishment and maintenance of aircraft stations, for experimental work in development of aviation for naval purposes, and for the purchase or manufacture and issue of special clothing, wearing apparel, and similar equipment for aviation purposes, $25,000,000 to be expended as follows:

1. For necessary aircraft and equipment for fleet use	$3,027,250
2. For the purchase abroad of five special type planes	100,000
3. For the erection on Government-owned land of two hangars for two large dirigibles	3,700,000
4. For the construction of one rigid dirigible	1,500,000
5. For the purchase abroad of one dirigible of the latest type	2,500,000
6. For the conversion of the United States steamship Jupiter into an aeroplane carrier	500,000
7. For the conversion of two merchant vessels into aircraft tenders	700,000
8. For the maintenance and operation of aircraft factory, helium plant and aircraft stations	3,008,007
9. For continuing experiments and development work for all types of aircraft	6,700,000
10. For flying equipment for Marine Corps advanced base units	618,000
11. For general and miscellaneous contingencies	2,646,743
Total	25,000,000

And the money herein specifically appropriated for "aviation" shall be disbursed and accounted for in accordance with existing law as "aviation" and for that purpose shall constitute one fund.

Mr. HULL. Admiral, you speak of having a bureau in the Department of Commerce to take charge of the matter of regulation, and things of that kind in connection with commercial aviation. Would a bureau of that character have the authority, or would you like to have them have the authority over the allocation of the fields to the Army or the Navy or commercial aviation?

Admiral TAYLOR. Not so far as the Army and the Navy are concerned, but in connection with the fields used for commercial purposes.

Mr. HULL. That is one of the things I think practically everybody is agreed upon, that there ought to be a consolidation of fields as far as that is possible. For instance, here in the city of Washington we have a naval field, an army field and a post-office field. It has seemed to a good many people here on the hill—most of us who are trying to get down to an economical basis—that if we gave to some executive department enough authority, they could consolidate all those fields and allocate to one department, either the Army or the Navy or the Post Office Department, the running of the field, with proper rules and regulations by which all of the departments could use that field. Is it not possible to do that sort of thing in most cases where you have a duplication of fields?

Admiral TAYLOR. No, sir; not as regards the Navy, because the Navy field is different from the Army field or the post-office field in that it has to be on a water front. The Navy primarily uses hydroplanes, and has to have special kinds of handling facilities for these planes; a landing place and a hangar for the hydroplanes; and all of these facilities, of course, have to be on the water front.

Mr. HULL. Could not that field also be used by the Army, the field to be under the charge of the Navy?

Admiral TAYLOR. If the Army had hydroplanes, I should say yes. This little field at Anacostia is largely for experimental purposes, so that the bureaus of the Navy Department, particularly the Bureau

of Ordnance, which has a large factory here, will have planes convenient for the purpose of developing and trying out experimental apparatus. That is one of the primary purposes for establishing a field here.

But the Navy fields proper are very few in number, and as I understand they are located in other cases independently of the Army. The number of fields was fixed by legislation in the last naval appropriation bill. The Committee on Naval Affairs goes over those matters very carefully every year, and you will find that the appropriations have been very largely reduced in comparison with the estimates.

Mr. HULL. Where you have two fields there is an overhead for each field, is there not?

Admiral TAYLOR. So far as the overhead is concerned, the people who talk about overhead usually neglect entirely the liaison, which would cause a great deal more expense. If you are going to have one machine doing work for three people, you have to have quite a good deal of organization to connect them up so that the three people get the use of it, and there is going to be a good deal of difference of opinion.

Mr. HULL. It has been my thought that most of the Navy fields, of course, are absolutely for the Navy, and in all probability if you had a bureau or an executive department of aviation the Navy would still retain their field. But it has occurred to me that in the case of most of their fields there are always places on the land sufficient to provide a landing place that the Army could use, so that it would not be necessary for the Army to have a separate field of its own in such a location. The Army has a tremendous number of fields, and if we could get the Navy to allow the Army the use of the Navy fields under rules and regulations that would be satisfactory to both services, that certainly would reduce the overhead of the Army because I know the Army carries a tremendous overhead on their fields.

Admiral TAYLOR. I do not think you would have to enact any law to allow the Army to use the Navy fields. I think the Army is perfectly welcome to use the Navy fields right now.

Mr. HULL. They do not seem to be doing it.

Mr. FULLER. Is it practicable for them to do it?

Admiral TAYLOR. I do not believe they would make use of them because the Navy fields are primarily located on the water front and the Army fields in the interior. As a matter of fact, the Navy has very few fields. The Committee on Naval Affairs cut them to the bone. I do not know what the Committee on Military Affairs did in regard to the Army fields, but the Navy fields are restricted under the law, I believe, to six flying stations.

Capt. CRAVEN. Six coastal heavier-than-air stations.

Mr. FULLER. How many lighter-than-air?

Capt. CRAVEN. We have altogether nine stations.

Mr. FULLER. You have three lighter-than-air stations?

Capt. CRAVEN. Three combination or interior stations, such as Lakehurst.

Admiral TAYLOR. That is hardly a station. It is being prepared; it was specifically authorized in the last naval appropriation bill.

Mr. HULL. Of course, the intention of the bill that I introduced is that we shall have consolidation under a proper head who would

have authority. The theory has been that this could be done without interference in any serious way with the Army or the Navy, simply eliminating a great deal of the overhead that is unquestionably carried by having a separate service. Why could not the lighter-than-air come right along; of course, the last bill contemplates having the lighter-than-air the same as the heavier-than-air. We are going to have two branches of the Government developing lighter-than-air, if we do not have a consolidation.

Admiral TAYLOR. Not unless Congress insists upon it.

Mr. HULL. Of course, the Army will be developing, and the Navy, too, unless we have some sort of a consolidation.

Admiral TAYLOR. There is a definite understanding between the Army and the Navy on that subject which has recently been arranged, and which was one of the results of the work of the Aeronautical Board which I was speaking of, which handles these matters for the Army and the Navy. It has been decided that the Navy will, for the present, do the development work on lighter-than-air material.

Mr. JAMES. Is that a recent agreement?

Admiral TAYLOR. That virtually reverts to an agreement made in 1917. But there had been very little progress made, and apparently last summer the Army undertook to branch out, in spite of that agreement. So this matter has been taken up, and I understand there is now a definite agreement which has been made. Capt. Craven can tell you more about that.

Mr. HULL. You do think there ought to be some bureau which would deal with the matter of rules and regulations governing flights over the country, and that that matter should be under one head?

Admiral TAYLOR. Civilian, commercial flying requires, naturally, some rules and regulations and some licensing. There should be some inspection of aircraft before they are allowed to be flown, just as there is an inspection of every commercial ship at stated intervals before they are allowed to navigate.

Mr. HULL. If there was some central organization which had control of the routes, and things like that, they would have to have some control over the Army and the Navy, would they not?

Admiral TAYLOR. Not necessarily; not any more than the Department of Commerce now has control over the vessels of the Army and the Navy. They have to do with civil and commercial vessels and not with Federal vessels. We are not required to build our naval vessels according to the rules laid down by the Steamboat-Inspection Service. But every commercial vessel built in this country is required to be built under those rules. When I speak of that I do not mean a large and expensive organization. I think at present a very small bureau might do all of that work. It should be started and allowed to grow as the necessities arise and as Congress, from year to year, granted authority or made appropriations.

Mr. JAMES. Did I understand you to say that you think it would be more wasteful to have one bureau to buy machines for the Army and the Navy than it would be if the Navy purchased its own machines and the Army purchased its own machines?

Admiral TAYLOR. I think it would probably result in that way in the end. Take the question of purchase. You would have an overhead for the purchasing division of the bureau or organization. In

the Navy we have one bureau which purchases everything for the entire Navy. It does the financial work in connection with purchasing airplanes, with practically no additional expense to us. That is an overhead which you would introduce at once into this proposed organization, with a separate board which would control the whole thing. We are able in the Navy to utilize our inspection people for the inspection of the aircraft and the material that is used in connection with the manufacture of the aircraft. A man who is capable of inspecting the things that go into the hull of a ship can also inspect the things that go into an airplane. That inspection work and that inspection force would have to be duplicated by an independent air service and that would add to the overhead, apart from the very large expense and the very serious loss in efficiency which I believe you would get from the difficulties of liaison between the Army and the Navy and the independent air service, difficulties which already are appearing abroad.

Mr. HULL. How do the foreign Governments conduct this kind of work?

Admiral TAYLOR. The methods vary. In Great Britain they have a separate air service, which happens to be under the secretary of state for war and has been since they started. They are supposed to handle all aircraft matters. There has been a great deal of misrepresentation about what is being down in Great Britain, about the enormous expenditures they were making, and all that kind of thing. A month or so ago it was stated that the air force had prepared a kind of program for next year, which, according to their estimates for next year, meant that they would spend £15,000,000 for all purposes, for every government expenditure in connection with aircraft. That, at the present rate of exchange would be a little over $45,000,000. Parliament generally passes the bill before the 1st of April, because their fiscal year begins in April. The program provided for the allotment of squadrons to the army and the navy and the independent air force, and it has recently been stated that in making that allotment the naval authorities were not consulted, and although the allotment has not yet been formally approved by Parliament, I saw recently in an English paper that the lords of the admiralty were threatening to resign because of the inadequate provisions made for the navy. The army had very few squadrons and the navy had very few squadrons. The lion's share had been assigned to the independent air force.

Mr. JAMES. How much are you asking for the Navy for the coming year?

Admiral TAYLOR. The estimates submitted were for about $35,000,000.

Mr. FULLER. What is the independent air force in Great Britain?

Admiral TAYLOR. That was called an independent air force during the war, an air force which operated independently of the land forces. Their principal work was attempting to bomb some distant German cities.

Mr. FULLER. I mean now.

Admiral TAYLOR. They have a Royal Air Service, which is a combined and separate air service and which is supposed to supply the army and the navy with the aircraft they need. Since it was started, I believe, it has been under the secretary of state for war, so their

situation virtually is as if there were in this country a nominal independent air service under the Secretary of War.

Mr. FULLER. What was the change that took place during the war when those air raids were being made on London, which resulted in the creation of the so-called independent air force?

Admiral TAYLOR. I am not very familiar with ancient history, but there was established first an air board, and then matters of production were handled by the ministry of munitions. The ministry of munitions produced aircraft just as they produced all munitions, both for the army and for the navy. There was an air council or joint air board, at one time.

Mr. FULLER. As I understand it, there was some board created to operate airplanes independent of the army and the navy?

Admiral TAYLOR. Not at that time. I think that was the operation of the army and the navy which came when the Royal Air Force was established. There were several stages. When the war started both the army and the navy had an air force. There was the Royal Air Force and the Royal Naval Air Service. They did not do what we did when we went into the war. We had a definite agreement between the Army and the Navy as to what each should do in the air, which was strictly adhered to during the time of the war. Apparently in Great Britain there was no such agreement, and there was some clashing.

Apparently, when they went into the war the army and the navy each wanted to control the whole air force. There was competition in the building of planes and engines, and the whole of their production was put under the ministry of munitions. Then there was an air board formed upon which the army and the navy were represented.

I am saying this subject to correction because it is not a matter which I was required to be acquainted with at the time of the war, and I only know what I read.

Mr. JAMES. Are you at the head of the Air Service in the Navy?

Admiral TAYLOR. No, sir; I am chief of the Bureau of Construction and Repair of the Navy Department, and have to do with the building of planes for naval uses.

Mr. JAMES. Who is at the head of the Air Service in the Navy?

Admiral TAYLOR. Capt. Craven is the director of aviation under Operations. In the Navy Department at present we have not a separate air service organized as the Army Air Service is organized. All aviation matters are handled as other matters in the Navy Department are handled, by the various bureaus of the department.

Mr. JAMES. Under whose direction would airplanes be purchased?

Admiral TAYLOR. The contract is made by the Chief of the Bureau of Supplies and Accounts upon the recommendation of the technical Bureaus of Construction and Repair and Steam Engineering, after the military features of the airplanes and the numbers to be purchased have been approved by the General Board and by Capt. Craven's office in Operations. The actual contract is made by the Bureau of Supplies and Accounts. The inspection work in connection with the construction of the planes itself is handled by the Bureau of Construction and Repair and of the engines by the Bureau of Steam Engineering.

Mr. JAMES. Suppose the House Committee on Military Affairs reports out a bill, would you say there should be any provision in the bill by which the Navy could still continue designing aircraft of all kinds?

Admiral TAYLOR. A good deal would depend upon the details.

If you are going to have an independent bureau which has to handle matters of production, they would have to have a designing staff, and if the Navy is going to fix its designs it would have to have a designing staff, too. You simply add one more designing staff to what you have at present, and you would introduce that additional overhead.

Mr. JAMES. I want to call your attention to an amendment proposed by Assistant Secretary of War Crowell to section 3. Section 3 is the section that deals with the control of production. Mr. Crowell would omit the period in line 24, on page 3, after the word "parts," and insert in lieu thereof a semicolon, and add the following:

Provided, however, That nothing herein contained shall be construed to prohibit the preparation by the War and Navy Departments of general plans and characteristics of the aviation mechanisms, accessories, and equipment required for military or naval purposes.

What would you think of a proviso of that kind?

Admiral TAYLOR. It is a little hard for me to visualize how some of these things would work. But I can visualize some of the complications which would arise. I understand under that provision the Navy Department would prepare its own designs and they would be turned over to some central body or organization for production. That sounds very easy. Suppose, from the time the plane is started you have 500 changes made in it; how is that going to be handled? Those are some of the infinite details we have to struggle with in actual practice which gum up the game very much.

Mr. FULLER. Why would you not be as much in touch with one central engineering department as you would with your own engineering department?

Admiral TAYLOR. Because that is physically impossible if that one engineering department is somewhere else. When the plane is completed, who is responsible for it?

Mr. FULLER. For the design?

Admiral TAYLOR. For the completed plane. Suppose it does not fly well?

Mr. FULLER. I should say the Secretary of the Navy, or whomever he appointed, or the Secretary of War, or the Postmaster General, or whomever they appointed to have charge of that work would certainly approve any plane to be used by their department before they accepted it. They would approve the design and the completed plane before it was accepted.

Admiral TAYLOR. Sometimes a plane does not function at all.

Mr. FULLER. Then do not approve it until it is satisfactory.

Admiral TAYLOR. Suppose this plane we are talking about is turned over to the production department to produce, and the plane is not satisfactory. They will say, "We did our part; we produced it according to the plans." Inevitably the Army or the Navy man would say you did not produce it according to plan. You would have a constant discussion going on. That is only one of the things which would inevitably arise when the responsibility is divided.

Mr. FULLER. I appreciate the fact that that is possible. But I do not believe that we are going to get appropriations from Congress unless we can show that we are going to receive a full dollar's worth of value for each dollar expended.

Admiral TAYLOR. The Navy Department is prepared to show that.

Mr. FULLER. If we have three departments engaged on the same kind of work it seems to me we are spending $3 where we only need to spend $1. Why should we duplicate the work on the designing of a plane, which is most expensive, is it not?

Admiral TAYLOR. No; not as far as a large portion of the design work of the Navy is concerned.

Mr. FULLER. I know a manufacturer of gas engines who last year spent $600,000 in experimental work on rotary valves, and a gas engine is supposed to be fairly well perfected.

Admiral TAYLOR. That is the rotary valve type?

Mr. FULLER. I mean that is a feature of the gas engine on which he spent that much money in experimental work.

Admiral TAYLOR. At present, as far as that is concerned, the Army and the Navy are usually informed of each other's experimentation, and there is no serious duplication of work.

Mr. FULLER. I think the machines we got, however, were more foreign than American, judging from the fact that we spent a billion and a half and have not much to show for it. I had had the impression that the fact that we fell down was because we insisted upon having an all-American machine. We could learn nothing from our allies; there was nothing that had been developed worthy of very serious consideration here.

Admiral TAYLOR. I do not think that is a correct statement of the case.

Mr. FULLER. Can you tell me where we fell down on the expenditure of a billion and a half dollars?

Admiral TAYLOR. One great trouble during the war was that we had too much information as to what was being done abroad. We had delegations here from France, from Great Britain, and from Italy, each giving different accounts of what was being done abroad, and each had its own planes which were the best in the world and which they wished us to duplicate.

Mr. FULLER. The fact remains, however, that after we had been making our own planes, Mr. Ryan, just before the armistice, went abroad and placed large orders in France and England.

Admiral TAYLOR. I am not acquainted with that, but as regards the Navy planes, they were not foreign planes. The planes which the Navy built were an American production.

Mr. JAMES. You mean built or purchased?

Admiral TAYLOR. We built some of our own and we purchased a number.

Mr. HULL. You are still building some, are you not?

Admiral TAYLOR. Yes; we are building according to the provisions in the naval appropriation bill.

Mr. JAMES. What would you think of a proviso which was suggested yesterday by Mr. Assistant Postmaster General Praeger, to add, on line 24, page 3, after the last word in section 3, the following proviso.

Provided, however, That nothing in this act shall be so construed as to prevent the War Department, the Navy Department, or the Post Office Department from designing or modifying equipment to meet the special needs of their separate activities, or from modifying allotted equipment, with a view to greater safety and greater adaptation to their respective services, such modification to be made under such conditions as the Director of Aeronautics may prescribe.

Admiral TAYLOR. It is a little hard for me to understand that, offhand. That apparently would have the same effect as the other amendment.

Mr. JAMES. What would you say to an amendment in line 20, page 3, section 3: After the word "as," insert the words "in the judgment of the Secretary of War, the Secretary of the Navy, and the Postmaster General," so that that part of the section will read:

Such types of aircraft as in the judgment of the Secretary of War, the Secretary of the Navy, and the Postmaster General will most meet the needs of the Government, to regulate and direct such activities in these respects as will promote and foster initiative and activity in the study and development of aeronautics in the manufacture of aircraft and aircraft parts.

Admiral TAYLOR. That is another case where you divide authority and responsibility.

Mr. JAMES. Mr. Praeger figured that in that way no planes would be manufactured for the Navy unless it was satisfactory to the Navy, and the same way with the Army and the Post Office Department.

Admiral TAYLOR. That would be a very desirable condition, but I do not believe he would reach it in that way. You would certainly have to have a very serious duplication of organization.

Mr. JAMES. Then, suppose we amend section 2 by saying that in providing for three Assistant Directors of Aeronautics, we have one appointed from the Navy who is a flying officer, and let him be Assistant Director representing the Navy Department, and let the same thing be true in connection with the Army. Do you not think if you had a board of that kind it would mean that no plane would be manufactured for the Navy or for the Army unless these men who are flyers and had had flying experience were satisfied that the planes would meet the needs of the Army or the Navy?

Admiral TAYLOR. I do not; no, sir.

Mr. JAMES. Do you not think that a flyer from the Navy who had had experience as a naval flyer and who was appointed as an Assistant Director of Aeronautics would know what the needs of the Navy were?

Admiral TAYLOR. Not necessarily.

Mr. JAMES. Why?

Admiral TAYLOR. Assuming that he passed on everything for the Navy, you would have one man settling it, and he would not be there all the time. After a certain length of time you would have a new man with different ideas. Either in the Army, or the Navy, or in civil life, you will find that opinions differ, and that applies particularly with aviation matters. One man may have very definite ideas along a certain line and another man may have very definite ideas along another line. The mere fact of putting a naval officer on that board would not by any means insure or guarantee that the product of the board would be satisfactory to other flyers of the Navy.

Mr. JAMES. Is not the matter in the hands of one man in the Navy now, as far as the types of machines are concerned?

Admiral TAYLOR. No, sir.

Mr. JAMES. Could not Capt. Craven buy any kind of a machine he wanted for the Navy?

Admiral TAYLOR. He could not.

Mr. JAMES. What would stop him?

Admiral TAYLOR. The question of the types of machines for which we are to spend any money is passed upon in the Navy primarily by the General Board. The General Board, I suppose, has spent possibly two months or more in the last year in hearings upon the subject of aviation. They have taken up the matter in great detail; they have heard a large number of flyers; they have considered not only Capt. Craven's suggestions, but they have heard a number of subordinates in his office before Capt. Craven came here for duty. I believe if you arrive at a settlement of that question by putting one man in charge of the Navy end of that work, he would not satisfy anybody but himself.

Mr. JAMES. Could not Capt. Craven override the General Board in the matter of the purchase of a machine?

Admiral TAYLOR. If the Secretary of the Navy approved it.

Mr. JAMES. Would not the Secretary of the Navy be quite apt to take his judgment, if he was the man delegated to look after that particular subject, rather than accept the recommendations of the General Board?

Admiral TAYLOR. The General Board is a very responsible board. and I think the Secretary of the Navy would be likely to take the ideas of the board rather than those of one officer. This question is one which is a very difficult and technical question, and it is a matter which none of the bills really covers except in a general and indefinite manner.

We have now a working machine in the Navy; it is not the best machine, but it works. We have a practice established which we are trying to improve all the time. This machine is working. If you throw away the machine and start to build another, it is going to be a long time, even assuming that it is a better machine—which it is not in this case—it would be a long time before it would be in working order. I do not believe you gentlemen realize the enormous complications of this problem and the difficulties which arise.

Mr. FULLER. It is because it is dawning on us that we realize the necessity of combining as far as we can. This is the way the trouble impresses me, as it has been developed by the testimony of witnesses before this subcommittee. The men who come from the War Department, the Navy Department, or the Post Office Department are interested each in his particular department, and quite naturally; and, then, there are others in favor of combination, just on general principles, without recognizing the needs of the different services. How are we going to develop the airplane and do it economically and efficiently? We have made one criminal blunder. We spent a billion and a half and did not get anywhere. Can we not start right this time?

Admiral TAYLOR. I am not discussing ancient history, and I would rather not go into that. But I do not think it is quite a fair statement

to say that we did not get anywhere. In the first place, it seems to me, it is not my business to advise you gentlemen.

Mr. HULL. That is just what we got you to come up here for.

Admiral TAYLOR. The first thing to consider is what are you going to do. If you are building a machine you do not just build a machine and decide afterwards what you are going to do with it. It seems to me that for the next 5 years or 10 years—I am a very poor prophet—but certainly for some time to come, the major portion of the Government's money which is going to be spent in connection with airplanes is going to be spent for the Army and the Navy. We heard some very big stories a few months ago about the enormous expenditures that foreign nations were making for commercial aviation and that we would be left far in the lurch if we did not do the same. That was propaganda from people who wanted to spend that money.

It is not a fact that foreign nations are spending enormous sums of money for commercial aviation, and I do not believe the Members of Congress are going to spend large sums of money for civil or commercial aviation in this country for some time to come, at least.

The obvious necessity for the next two years is to provide aviation for the Army and the Navy. It is a vital element in fighting on water and on land. The appropriations are going to be much smaller in the next few years, apparently, than could be used to advantage by both the Army and the Navy in the development of aviation. I do not believe there is going to be any danger of wasting a billion and a half dollars in the next few years.

As far as the Navy is concerned, during the war the primary object to which it devoted its energies was in the antisubmarine work, from the point of view of aviation. It was decided in 1917 that naval aviation should have the preference because it was primarily devoted to the antisubmarine work. Submarines were at that time apparently a primary factor to be considered. We developed different planes and stations to be utilized in the campaign against the submarine. That material is still in existence, much of it is available at once; and the major portion of it would be available with very little overhaul in case we had a similar situation to deal with.

But the mission of aviation in the Navy since the war, I think Capt. Craven will tell you, is to utilize it as a part of the everyday work of the Navy, to have the aviation service available for the Navy in time of war, no matter where it fights, whether it is a thousand miles from land or within five miles of land, and that is what is now being developed and concentrated on in the Navy. And it can be developed to advantage only by the Navy itself. If you turn that over to a production board, to people who know nothing about the sea, they have to acquire all that knowledge, and in the end the result would be that they would either have to do exactly what the Navy says, in which case they would be simply a rubber stamp, or they would have to go along their own lines and force upon the Navy what it did not want. There is no alternative to that proposition.

When it comes to the question of economical expenditure, Congress decides that the Navy shall have this year a certain amount of money. So far we have not found that there is any disposition since the war to give us a lump sum and let us do what we please

with it. Every year we have to go before the Committee on Naval Affairs and justify every penny of our estimated expenditures and tell that committee exactly what we contemplate doing, and they are the people who settle the policy of development. It is not the Army or the Navy. It is Congress, as far as the Navy is concerned, who settles what is to be done.

Mr. JAMES. Are you manufacturing airplanes because you think you can produce better machines in that way or because you think it is cheaper?

Admiral TAYLOR. You mean the Navy itself?

Mr. JAMES. Yes; the Navy itself.

Admiral TAYLOR. We went into that during the war because it was absolutely necessary to increase the productive capacity of the country. We had reached a limit and we had to do something more. We were just as able to build an aircraft factory and operate it and produce airplanes as the people who had had absolutely no experience, who were also being given money to build aircraft factories and operate and produce. That was the reason why we originally started our aircraft factory. Besides that, it has been the established policy of the Navy for a number of years to do some of its own production, not all of it, because we wish to make sure that we are not entirely in the hands of outside contractors.

Mr. JAMES. What percentage of your appropriation for next year will you use yourselves for the building of airplanes?

Admiral TAYLOR. I do not know how that was figured; but we have placed orders this year with a number of outside concerns for the building of airplanes. But there is a difficulty in doing development work with outside concerns, and it is a very practical difficulty. Say we wish to get an airplane with certain characteristics. It is a new type. We advertise and get a number of designs and a number of bids. We take the one which seems most advantageous, all things considered. That private contractor then is up against the proposition of virtually developing a new type of aircraft. I am speaking of development work and not of reproduction work. We have found that it is very hard to estimate in advance what it is going to cost. Suppose the private manufacturer gets an order for three machines. We like to place an order for at least three experimental machines, because one alone is hardly enough to try. Suppose on trial the first one crashes. That man then is out of pocket at once unless he charged us originally an exorbitant price. It becomes a gamble for a private contractor to undertake to develop new types. A large concern might be able to gamble on that, but we do not wish to restrict our development to large concerns, because they are not necessarily the best concerns, and the small man is almost unable to undertake the development of a new type of plane on the ordinary basis. That is one of the practical difficulties that we are up against, and that is where our own factory facilitates development.

Mr. HULL. You think it is more satisfactory to do the development work yourselves?

Admiral TAYLOR. I would not say that, Mr. Hull, because we try to utilize outside designers to the limit. When we undertake to develop a new type of machine we practically always advertise for designs. But we run into this serious practical difficulty, that the

airplane people outside find it very difficult to undertake a contract for a new type of plane on a lump-sum basis.

Mr. HULL. How about the expense?

Admiral TAYLOR. We have been working, of course, under war conditions so that our planes were built somewhat more cheaply than outside planes. Now, it is very difficult to tell, because the factory is doing repair work also. We also have cut it down to something less than one-quarter of its full capacity.

Mr. HULL. Then if you were to run it to its full capacity you would cheapen the cost of the output?

Admiral TAYLOR. The original factory was multiplied by four. We started at the end of August, 1917, and about the end of December, 1917, the demand came from abroad for a largely increased number of planes. So we multiplied the factory by four and developed it into an assembly proposition. The bulk of the work for the enlarged factory was done by outside people, such as the Victor Talking Machine Co. Since the war our factory has been largely used for storage. It is full of aircraft material and we are using much less than a quarter of the total factory area for construction and maintenance work.

I might illustrate one case which shows the advantage in being able to do our own work to some extent, which is the fixed policy of the department. We were anxious to fit out a number of ships going south with land planes for flying, small land planes. The Army had a number of them which we got from the Army. They had come from abroad; many of them had not been taken out of the boxes; many of them were in poor condition. We really did not know their condition. This was a hurry-up job, and we simply shipped the whole outfit to the aircraft factory and told them to overhaul those machines as best they could, and they managed to get them overhauled in time to send many of them south with the fleet. It would have been absolutely impossible to have done that if we had attempted to contract for it. No contractor does things of that kind. That sort of situation is liable to develop all the time, which makes it desirable for us to have our own factory. It is being run on a very small scale now, and we are still further reducing it.

Mr. FULLER. Then, Admiral, in such a comparison as you would make between having work done on the outside and doing it yourselves, the Navy is able to do it cheaper and better themselves?

Admiral TAYLOR. I would not say that. I think if we can place a lump-sum contract we can frequently get our work done more cheaply. But if we place it on the cost-plus basis, then the cost mounts up.

Mr. FULLER. But experimentation work must be done on a cost-plus basis, must it not?

Admiral TAYLOR. When we place our orders for a new type of plane with an outside contractor we assume the insurance; that is, if the plane crashes it is our loss and not his. That is rather unusual in Government contracts, but it was necessary. We took the position that if we approved a design that ought to fly we would be responsible for the crashing, otherwise any man who takes a contract for three planes has to charge us at least for four planes and possibly five in order to cover the risk of crashing. It is very difficult to get insurance on such things.

Mr. FULLER. Is it not practically an impossibility for you to make an arrangement with an outside concern for a fixed price on work on a new design, and if you do get a fixed price you later pay for making changes?

Admiral TAYLOR. It is not very difficult to make such a contract, but it is very difficult to carry it out. In the past they have nearly always resulted badly. The contractor found that he had underestimated, and that is always a very bad situation in the case of a contract.

Mr. FULLER. The condition does develop almost always during the manufacture of a first model?

Admiral TAYLOR. In a new type it is almost always the case.

Mr. FULLER. So it would be more satisfactory to do the work yourself, everything considered?

Admiral TAYLOR. It is an advantage, but we do not feel that we ought to undertake to do anything ourselves. We believe that the outside engineers and the other people are entitled to some of our business and we try to encourage them as much as possible.

Mr. FULLER. You are getting into a wide field there, because then the question would come, when you interest outside manufacturers, how are you going to keep them going? We can not take on everything in order to keep an industry alive and stimulate it from time to time, artificially or in any other way. We are really interested in developing the airplane as a part of the national defense.

Admiral TAYLOR. That is exactly what we are interested in. We do not feel that we are responsible for developing aircraft factories simply for the purpose of developing them.

Mr. FULLER. But when you start outside, I hear a lot of talk about keeping the industry going, getting it started, and reviving it. It does not strike me that that is a governmental matter.

Let me give you a little picture of how this is shaping up in my mind. It seems to me that we should have a headquarters for our engineering work on airplanes, a Government headquarters, where we would have that work. The Navy would say what it wanted, just as you do in the case of an outside concern. I can not believe but that this governmental engineering headquarters for designing could do that work as efficiently as an outside concern, if not more so.

Now, at that engineering headquarters they would have tools for expansion so that we could go quickly into increased production. If we are going to consider rapid production in utilizing our industrial resources we must have that preparation somewhere, either in the individual concerns which we favor or at some headquarters of our own.

I am getting to the point as to where we can combine the airplane work of the Army and the Navy and the Post Office Department. Can we not do it somewhere; must it be absolutely independent all the way through? And if it is absolutely independent, is not a lot of the work going to be duplicated? In some respects or for some work does not the Navy use the same engine as the Army, and does not the Post Office Department use the same engine as the other two?

Admiral TAYLOR. Absolutely; in fact, during the war the Navy planes used the Liberty motor which the Army developed.

Mr. FULLER. Would that be true in the future; or would it call for a different motor?

Admiral TAYLOR. That would be true in the future, largely. The Navy, for certain types of planes, needs, perhaps, other and more powerful motors than those which were used in a majority of Army planes.

Mr. FULLER. And the Navy has some much smaller, I suppose, too?

Admiral TAYLOR. Oh, yes; but they would use the same types of engines. There has been in the past no duplication in that. The Navy has utilized Army engines to the limit, as far as I know. As regards the Liberty motor, the Navy used that engine altogether. There was originally a slight difference in the Liberty motor built for ahe Navy and for the Army.

Mr. FULLER. Just in regard to the matter of compression?

Admiral TAYLOR. Yes; just in regard to the matter of compression. But we are now using in the Navy a high-compression engine very commonly. The 12 motors of three N-C boats were all high compression motors, and none of them, I believe, gave the slightest trouble on the flight from Newfoundland to the Azores.

Mr. FULLER. How can we go before Congress with a program that will develop this branch of the service, which we all want to do; how can we do that most efficiently and economically? Can we not combine somewhere along the line?

Admiral TAYLOR. The idea you suggest, of having the Government control, if I may put it that way, in the matter of engineering—do the inventing work, so to speak—was somewhat the idea which was tried in Great Britain some years ago in the Royal Aircraft Factory. There was the bitterest complaint. You know, the ordinary person thinks the Government engineer is no good, anyway. There was the bitterest complaint about the Royal Aircraft Factory attempting to monopolize the engineering and design. The moment you attempt to repeat that experience in this country you would run against exactly the same complaint, which would be justified to some extent. I believe you should allow the outside engineer—and, I think, we have some very good ones in this country, and we also have some very good ones in the Government service—but the ouside men should be given an opportunity, in competition with each other and in competition with the Government engineers. I think you would get the quickest development along that line.

Mr. FULLER. That is my point; not to eliminate the outside manufacturer.

Admiral TAYLOR. I am speaking of the outside engineer.

Mr. FULLER. Or the outside engineer; not to eliminate them, but for the Government not to adopt them and take on the responsibility of supporting them. But we should allow them to compete, and there is nothing in the idea of having governmental headquarters for engineering development that would prevent their competition with one another.

Admiral TAYLOR. I do not feel, as far as I am concerned, that it is the function of the Government at this time to subsidize airplane manufacturers in this country simply to keep the factories going.

There were a large number of big factories started during the war which have gone out of the business—people like the Fisher-

Body Corporation, and other people of that kind who were regularly engaged in other work. They have stopped the work on airplanes, and they do not want to carry it on. Take, for instance, the Victor Talking Machine people, in Camden, N. J. They did an enormous amount of work for us during the war in connection with our large airplanes, but the demand for Victrolas then was perhaps low, and it was not an essential industry at that time. But they have gone gack to their regular work now. The aircraft factories have been already reduced very largely, and there are very few large factories left in this country.

Mr. FULLER. But a distinguishing feature in connection with maintaining the industry outside seems to me to be this: If you make an appropriation and some industrial concern devotes its engineering and manufacturing facilities to building these planes, of course, as soon as they are completed, regardless of Government requirements, we must make another appropriation, otherwise we have just stimulated these manufacturers for about six months.

Admiral TAYLOR. Of course, the hope and expectation is that the demand for commercial aircraft will increase.

Mr. FULLER. Do you think we are warranted in anticipating that? Have we got enough troubles of our own?

Admiral TAYLOR. I believe I have been criticized for saying that we have no commercial aviation, but it is a correct statement at present. I had expected to see commercial aviation develop more rapidly than it has. But I am beginning to be pessimistic because it has not materialized. I do not believe commercial aviation should be developed by subsidizing it when it does not pay.

Mr. FULLER. I agree with you absolutely.

Mr. HULL. I am glad to hear you say that.

Admiral TAYLOR. As regards the idea which I understand you to have in mind, to provide facilities in time of war——

Mr. FULLER (interposing). Yes; for expansion of production.

Admiral TAYLOR. For the next few years we will have in this country a reserve of people who engaged in that work during the war. They could be turned back to that industry very promptly. The people who went into this work during the war were people mostly without previous experience. Take the case of the aircraft factory, for instance.

In May, 1917—they began production in April and were getting an increased production—they had at that time something under 2,000 people. There were not 5 per cent of the people employed there, men or women—and we had a great many women employed there—who knew anything about airplanes three or four months before. But the people who did the work are still in the country, and we could in case of an emergency replace the aircraft factory again on a large production basis by the time the materials were gotten ready. By the time the material was collected there would be people to handle the material. And the same thing would apply to other facilities. The Curtiss North Elmwood plant at Buffalo could be vitalized again.

Mr. FULLER. That would apply to the factory and the factory laborer. But if war broke out to-morrow we would have three steps that would be necessary to take in order to have airplanes. First, there would be the design; second, there would be the neces-

sity for new factories and for tooling up; and third, we would have to put them into production.

It would seem to me that it would be the duty of the governmental engineering headquarters to have the design, and not to have to call a consultation of engineers down here in a hotel after war had been declared, but to have the design ready; and secondly, to be tooled up as far as it is possible to go. And if we are going to tool up in anticipation of production, the Government will have to have tools anyway, and we might as well have them ready for distribution and have the plans made for manufacture.

Admiral TAYLOR. The tooling up of an aircraft factory, as far as the plane proper is concerned, is not a very serious proposition. But the engine is another thing. Apparently your conception is that we would not do anything before war broke out.

Mr. FULLER. No; that is why I am advocating this governmental headquarters where we would have the tools and the designs.

Admiral TAYLOR. If I may say so, my idea would be that we should have the planes.

Mr. FULLER. You would not have planes enough in times of peace for war?

Admiral TAYLOR. You will have in time of peace an Army and a Navy of a certain size. They should have their outfit of planes in their tactical branches up to date. In the Navy we should have our airplanes ready, just as we have our battleships ready, so that when we went to war the Navy would have its airplane service complete, otherwise we would be lacking. When you expand the Army and the Navy you can not do that overnight. In order to get men and get them trained to some extent and get them ready for service, even with the reserve, there is a certain time element that must come in there. But, of course, so far as the production of aircraft is concerned, it could be done almost as fast as you could get the people ready for them, as you expand your organization generally.

Mr. FULLER. I do not quite understand that.

Admiral TAYLOR. I say the expansion of aircraft could be carried on with equal pace, along with the general expansion of the Army and Navy incident to war.

Mr. FULLER. Do you not think it could be done much more rapidly? Do you thing it is a fair comparison to say that it is necessary to have the airplanes you need in time of war ready in time of peace?

Admiral TAYLOR. For the battleships you then have.

Mr. FULLER. But they have the battleships, have they not?

Admiral TAYLOR. In other words, a certain amount of aviation is necessary in a well-balanced Navy and Army just as a certain number of guns are necessary and a certain amount of ordnance is necessary for the Army. And instead of saying we will develop that and be prepared to build it after the war opens, we should have that ready.

Mr. FULLER. I do not mean to build it; I mean to be prepared for the rapid expansion that would be necessary. I am assuming that we would have enough airplanes in stock to go to war with a foreign power.

Admiral TAYLOR. That would depend entirely on where we went to war. There is no use in talking about airplanes on general principles unless you know what you are going to do with them. We might have enough in stock for a war with some powers, but not enough for others.

Mr. FULLER. How many airplanes do you think we should have in stock at one time?

Admiral TAYLOR. I could not say off hand. That is a matter which in the Navy would be primarily passed upon by the General Board in view of the size of the Navy, just as they pass upon our necessities for ships of all types.

That is another illustration of what it seems to me is in some of the rainbow-chasing bills. You have got to settle what you want to do before talking about the means. In many of these bills you are providing means without knowing what we are to do.

Mr. FULLER. We are considering a start and you are bringing up the question of whether in making a start, having the right airplanes and being ready to go into great production, we should not have the airplanes absolutely in stock.

Admiral TAYLOR. As far as the Navy itself is concerned, it is not necessary to consider a stock. We have a stock and we have a large proportion of airplanes which would be used for patrol work ready now and available for service, which would undoubtedly be a large necessity, presumably, in time of war, if we went to war with certain nations.

Mr. JAMES. The Navy has not enough airplanes in case of a war with Great Britain?

Admiral TAYLOR. It depends on where the war would be carried on. We have enough to patrol the coast. As to the airplanes to go with the fleet, that is a question of development, and we do not know positively whether we will finally have large airplanes, small airplanes, or medium-sized airplanes. We have to get them with the fleet and get them working in order to determine some of those questions.

Mr. FULLER. If you do not know, how can we decide it?

Admiral TAYLOR. You gentlemen have to decide it from year to year.

Mr. FULLER. But we are talking about a start now, and we are advocating as a start the development of the type of planes that is wanted, and having some preparation made for a large production in time of war. I think you will agree that we are never going to produce, in time of peace, one one-hundredth of the planes we will need in time of war.

Admiral TAYLOR. As regards the Navy, I do not think that is quite a correct representation. Let us assume that we carry airplanes on all our battleships. That would be an essential part of the battleships, just as much as the small boats or anything else, and we would want them in time of peace.

Mr. FULLER. There is no question about that.

Admiral TAYLOR. When we go to war we are not going to double or treble the number of our battleships.

Mr. FULLER. Certainly not.

Admiral TAYLOR. As far as that branch is concerned, we should have ready and available planes for every battleship, and a reasonable resrrve.

Mr. FULLER. There is no question about that. But am I entirely wrong in assuming that you would want five times as many airplanes in time of war as in time of peace?

Admiral TAYLOR. That is impossible to answer because it depends entirely upon the kind of war.

Mr. FULLER. We can not anticipate that.

Admiral TAYLOR. The expansion of airplane work for the Navy in time of war would not be, presumably, as great as the expansion which was found necessary in the war in Europe when people were fighting each other across their boundary lines.

Mr. FULLER. It is my opinion that if the Army and the Navy go before Congress in time of peace and ask for as many airplanes as they had in time of war they will have a hard time getting them. It seems to me that is unreasonable, especially with the art developing as rapidly as it is. Gen. Patrick says that an airplane is no good 90 days after it is built.

Admiral TAYLOR. We heard a great deal of that kind of talk while the war was going on. As a matter of fact, from the time of the conception of a new airplane or engine until that airplane or engine was in service at the front was never less than a year.

Mr. FULLER. You mean here?

Admiral TAYLOR. No; in Great Britain, so we were officially informed. This talk about building airplanes overnight had a great deal to do with the misconception of what could be done. The start of a new design of an airplane or engine and getting that into production and getting it at the front in any quantity was never done in less than a year.

Mr. FULLER. That is true of a complete airplane. But I think you will agree that the art is developing so rapidly that if we put a design into production to-day you would make 200 or 300 changes before it is completed, would you not?

Admiral TAYLOR. We have not found it that way, quite.

Mr. FULLER. I thought you spoke of that advantage, if you did your own experimental work.

Admiral TAYLOR. There are liable to be a number of changes if the plane does not work, but they are not changes in the way of development. They are changes in carrying out the original design.

Let me give you one case in point. We adopted in 1917 a certain type of flying boats as one of the standard types. The machine was built and was flying. It was the first machine that ever flew the Liberty motor. We got the first Liberty motor and put it in a plane that was satisfactory for a number of our purposes. We placed large contracts for those planes not only with the original designer but with outside concerns, and the original designer was to make the plans. That was the largest airplane company in this country. There was delay in getting it started in the original company, and so there was also delay in the other companies getting started, because of the number of changes in small details which the original designer made. But there was no change in the general plan and there was no change in the performance. It is simply in constructional details where you make a number of changes. If you attempt to

make radical changes in the characteristics, you have to almost throw it away and start over again.

Mr. FULLER. Of course, it is those little details that have to be considered in making improvements. You could change about everything else except the bow and the strut and call them details, could you not?

Admiral TAYLOR. There are a great many thousand parts in the plane itself.

Mr. FULLER. You are apparently very well satisfied with the airplanes you have in the Navy.

Admiral TAYLOR. No, sir; we are thoroughly dissatisfied with them and are trying to improve them all the time. We do not stand still.

Mr. FULLER. We spent a billion and a half dollars on aviation, and still aviators come before this committee and say they never flew an American plane—aviators like Rickenbacker, Biddle, and Meissner say they never flew an American plane.

Mr. JAMES. Gen. Pershing said there was not a single American-built fighting plane over there on the date of the armistice.

Mr. HULL. As a matter of fact, the Army never produced a real fighting plane and has not one now, I think. That is pretty close to the truth?

Admiral TAYLOR. That is a matter which I would not care to discuss, but I think I might say that there was no attempt made to produce the kind of fighting planes referred to in this country. They were intended to be produced abroad, and the people who fell down on that, if there was any falling down, were not the people in this country, but the people abroad.

Mr. HULL. We atempted to produce them; we had them in production at Buffalo, coming through.

Mr. JAMES. Certainly when Congress appropriated a billion and a half dollars Congress supposed we were spending the money for fighting planes.

Mr. FULLER. Congress apropriated the money and these men designed the Liberty motor, and that was supposed to take care of all kinds of airplanes. Then after we built those Liberty motors, of course, we only built such airplanes as would carry the Liberty motor. We tried to put the Liberty motor in a Bristol plane, but they were all discarded; the motor was too large for the plane.

Admiral TAYLOR. I presume you gentlemen who are investigating Army matters do not want to hear from me on that subject, but I think you have some misinformation about that. The Bristol fighter was a two-seater plane, and the fighting plane has been restricted to a single-seater abroad.

So far as I know, there was no attempt made to produce in this country a single-seater fighter; there was no attempt ever made to put the Liberty motor in a single-seater fighting plane.

Mr. FULLER. No; because the two-seater could not handle it.

Admiral TAYLOR. Some two-seaters could; the DH-4 is a two-seater.

Mr. FULLER. We did not make a two-seater that was large enough to handle it.

Admiral TAYLOR. The DH-4 was a two-seater. There were a number of those shipped abroad.

Mr. HULL. Speaking of fighting planes, the Spad was put in production at the North Elmwood plant at Buffalo and was coming through.

Admiral TAYLOR. No, sir.

Mr. HULL. What is that?

Admiral TAYLOR. They never produced one.

Mr. HULL. No; but it was ready to come through when a telegram was received signed "Pershing"—and nobody seems to know why that was sent—stopping production, or requesting them to stop production on the Spad machine.

Admiral TAYLOR. There was a contract made, but I do not think they had reached the point of production by any means.

Mr. HULL. That is the testimony we get. They had reached the point of practical production at the North Elmwood plant when it was stopped, and the testimony shows that if they had gone on with the production we would have had fighting planes.

Admiral TAYLOR. My recollection is that the point of production had not, by any means, been reached.

Mr. FULLER. At any rate, they did not produce any of those machines.

Admiral TAYLOR. The contract was made but the cancellation came along before they had made any serious progress. My recollection is that they had had the sample machine up there only a very short time. A Spad machine was purchased abroad and sent up there. I happen to know something about these matters because I was one of the silent members on the much-abused Aircraft Production Board.

Mr. FULLER. We are apparently between the devil and the deep sea. One plan called for each department to be absolutely separate and independent.

Admiral TAYLOR. What plan is that?

Mr. FULLER. I think that is the plan advocated by you in regard to the Navy, for example.

Admiral TAYLOR. Not at all.

Mr. FULLER. Where can we combine these things for the sake of economy and efficiency?

Admiral TAYLOR. The War and the Navy Departments?

Mr. FULLER. I am talking also about the Post Office.

Admiral TAYLOR. Perhaps the news has not reached you gentlemen, but steps have already been taken necessary to provide complete cooperation and avoid duplication. It was the Aeronautic Board which passed, in the first place, upon the estimates. The Navy Department submitted to that board last fall a detailed statement of the estimates, together with a statement of the purposes of the amount asked for in every case.

Mr. FULLER. That is more or less voluntary. We want to give you something that is prescribed.

Admiral TAYLOR. That is voluntary. The board changed the Navy estimates; there were a number of modifications made, and, after that, of course, those estimates which had been approved by the board were arbitrarily reduced by the Secretary, and the committee will arbitrarily reduce them much more. But that is being done so far as aviation is concerned, because both the Army and the Navy come within the sphere of that Aeronautical Board.

Mr. JAMES. When was that established?

Admiral TAYLOR. That was established in August or September. Questions of productions during the war were handled by the Aircraft Production Board, which was a joint Army and Navy board. There was absolutely no conflict as regards production during the war.

Mr. FULLER. You understand, Admiral, there is no intention in either one of these bills to arbitrarily take over any of these functions of this board, which would have the authority, if it saw fit, to let the thing go on just as it is. It is not arbitrary at all.

Admiral TAYLOR. I do not like to criticize because I have not studied these bills carefully. I did not know I was coming before the subcommittee until this morning. But if you establish a board and it does not have any powers——

Mr. HULL (interposing). It has the power.

Admiral TAYLOR. It will be like the mother who told her daughter to hang her clothes on a hickory limb.

Mr. FULLER. I do not agree with you. It would have the power. Do you not think it is absolutely essential that your department should pass on the planes you are going to use?

Admiral TAYLOR. I think so, for efficiency.

Mr. FULLER. Instead of giving this board the power.

Admiral TAYLOR. If you do not pass a law like that it will not last.

Mr. JAMES. The amendment I read, which is suggested to be made on line 20, would provide that no airplane should be manufactured for the Navy until it had received the approval of the Secretary of the Navy.

Mr. FULLER. That is absolutely essential.

Admiral TAYLOR. As far as that is concerned, then the board would simply be a rubber stamp.

Mr. FULLER. It has got to be one or the other. You would not advocate that it have control over the design of the planes which it would give to you?

Admiral TAYLOR. It would depend on the circumstances.

Mr. FULLER. It would not depend on anything at all, would it? You would not advocate any board outside of the Navy telling you what kind of planes you are to have in the Navy?

Admiral TAYLOR. Certainly not.

Mr. FULLER. Then that board need not of necessity be a rubber stamp. You can have a centralized purchasing department, can you not?

Admiral TAYLOR. It would be a rubber stamp as regards any question in reference to the design of the Navy planes.

Mr. FULLER. They could advise. Surely if the Navy had an engineering department, and as a result they did work for the Post Office Department and the Army, the Navy would be open to advice, would they not, as the result of their work?

Admiral TAYLOR. You mean the Navy would be open to advice or the central board?

Mr. FULLER. No; the Navy, because they would make the decision.

Admiral TAYLOR. You can not have two people making a decision.

Mr. FULLER. I tried to make that perfectly clear.

Admiral TAYLOR. I did not understand you.

Mr. FULLER. The Secretary of the Navy will have to approve the design of any plane that comes under the operation of the Navy,

surely, and beyond question and without doubt the same thing would be true of the Secretary of War and the Postmaster General. My idea of a centralized engineering department is one that would do for the Army, the Navy, or the Post Office Department whatever they wanted done in experimentation and manufacture and work of that sort. It would seem to me that an engineering department doing work for the War Department and the Post Office Department would be able to consult with the Navy Department and perhaps give them the benefit of their experience.

In building an Army plane or a post-office plane would not that be possible?

Admiral TAYLOR. As a practical proposition it would work if the Navy had its own engineering organization. The Secretary of the Navy would have no personal knowledge of it. That is what I believe would inevitably happen.

Mr. FULLER. Then your reply would be if you had a business with seven departments and one centralized purchasing department you would have in effect seven purchasing departments?

Admiral TAYLOR. There is a great deal more than purchasing in this.

Mr. FULLER. I agree with that.

Admiral TAYLOR. We have in the Navy one department which is really the business department in the Navy. This is a question of developing and utilizing a weapon to be used in war. We have been through this in the Navy, and we are situated in the Navy differently from the Army in that our regular work comes more closely along mechanical lines. We have in everyday life in the Navy more nearly the problems which must be solved in connection with aviation matters. The Navy is largely an engineering proposition. How would you originate a design of a plane under those circumstances?

Mr. FULLER. In the Navy.

Admiral TAYLOR. Then, the Navy would have to be able to design a plane; the Navy would have to have an engineering force to design the plane; it would have to have the approval of the Secretary of the Navy; his approval would be the approval of the operating people in the Navy and of the engineering people in the Navy. In other words, your centralized engineering board would be a fifth wheel, as far as the Navy was concerned.

Mr. FULLER. Let us say you would have in this centralized engineering department every airplane in the world, and if the other arrangement were in force you would have those in three places.

Admiral TAYLOR. If you are willing to go to that large expense.

Mr. FULLER. But it would only be one-third as large in a central department as it would be if the departments were run separately.

Admiral TAYLOR. I think it would not work if it were only one-third as large, because no one engineering branch now is able to do the work for the other departments. They are all occupied. I should say it would duplicate very largely the present engineering departments. You would have to devote to the total amount of engineering, which is now represented by, say, three, somewhere between four and five.

Mr. FULLER. Before we start on this airplane program we ought to have in this country every good airplane that has been built in other countries.

Admiral TAYLOR. Why?

Mr. FULLER. Do you not think we can learn a lot from other countries?

Admiral TAYLOR. We can learn a great deal, but if you are going to start on that basis you will never get anywhere.

Mr. FULLER. That is the basis we started on in connection with motor cars. We imported the best in the world, and the best there are in America are thus taken from Europe.

Admiral TAYLOR. Did the flivver come from Europe?

Mr. FULLER. But they came from Europe long before that.

Admiral TAYLOR. That is a fundamental fallacy you have, that you could get a lot of airplanes and hybridize them and get the best. As I view the situation, to come back to the same practical proposition, what do you want to do? We find from our people at sea that we need to have a plane to carry certain things, to have a certain battery, to have certain endurance, and to have certain speed, we will say. We take it up with the General Board, which goes into those matters, and with our flying people, and we finally lay down or decide upon the military characteristics.

That proposition is put up to the engineering people, who find that it can not be done in one plane, and the engineering people go back to the General Board and the operating people and they say, "We can not do it, but we can do this other thing." In close cooperation and in personal consultation daily they finally say, "Here is a plane that can be made; this is good enough, and we will go on with it." That is the way, and the only way in which you can satisfactorily evolve a plane, from my point of view, for Army and Navy purposes. You have to first regard what is needed, and then you have to go ahead with the engineering proposition and develop it.

When the engineers alone evolve something it will do no good unless the operating people approve it.

Mr. FULLER. I am astounded at your statement. You say before you build a plane you find out what our people——

Admiral TAYLOR (interposing). What you want to do with it.

Mr. FULLER. Why could you not learn something from the English, the French, and the Italians?

Admiral TAYLOR. You could, of course.

Mr. FULLER. Why would it not be highly desirable to do that?

Admiral TAYLOR. It is being done. We collect information from abroad all the time, and we also collect a great deal of misinformation from abroad. The original idea, apparently, when we went into the war was that we would take the foreign plane and duplicate it here.

Mr. FULLER. If that was the original idea it was soon forgotten.

Admiral TAYLOR. Because that was found to be practically impossible.

Mr. FULLER. Why?

Admiral TAYLOR. I have heard a great deal of criticism because we did not take a foreign engine and duplicate it over here. But if you consider the history of the Hispano-Suiza engine in this country——

Mr. FULLER (interposing). We wanted to go into immense production.

Admiral TAYLOR. The question of producing the foreign engines, as a practical proposition, seems to be very simple, but it is not. The Hispano-Suiza engine came to this country through a contract placed by the French Government with the Wright-Martin Aircraft Corporation. They supplied full engineering information and sent over here a lot of engineers. If I am not mistaken it was a year before that company was able to begin the production of the Hispano-Suiza engine, which was one of the best of the foreign engines. And they made every effort to get that production under way. Money was no object to them. That is not quite as simple a proposition as it may seem.

Mr. FULLER. It is not simple, of course, but we disregarded the matter of results and efficiency of design, it seems to me, and sacrificed altogether too much of accomplishment to get something that we could turn out in great quantities. We gave primary consideration to quantity production.

Admiral TAYLOR. That was absolutely necessary.

Mr. FULLER. I do not see where you got results. Your aviators do not speak of the airplanes in very complimentary terms.

Admiral TAYLOR. I was speaking of the engine itself.

Mr. FULLER. And the same thing applies to the engine. We had one engine for one type of plane, and they told us that type was not of much use. What did it accomplish?

Admiral TAYLOR. I am not taking that up. I am talking about the production end.

Mr. FULLER. Do you not think, looking at our program by and large, that the one thing we must give consideration to is getting into production with speed in the event of war?

Admiral TAYLOR. It should be provided for, of course.

Mr. FULLER. And tools are an essential part of that, are they not?

Admiral TAYLOR. I think myself that the organization, the men, are more important than the tools.

Mr. FULLER. I thought you said we had the men. We can not train thousands of workingmen for that job in time of peace.

Admiral TAYLOR. Not very well, unless you have a large amount of work going on. But the training during a war is a comparatively simple thing, in making airplanes according to present plans.

Mr. FULLER. I remember when Ford took up a contract, it took them quite a while to tool up, and it would seem to me that would be a part of our preparedness program.

Admiral TAYLOR. For making engines in large quantities?

Mr. FULLER. Yes.

Admiral TAYLOR. I was thinking more of the plane proper than of the engine.

Mr. FULLER. The same thing, in a way, would apply all the way through, by way of being prepared, having blue prints, and things of that sort.

Admiral TAYLOR. The plane proper is not so much a question of special tools. It is a question of having sufficient working tools. But in the case of the engine, it is a question of getting special tools and fixtures, and that does not apply to the plane.

Mr. FULLER. It does not exactly apply, but it is almost as much applicable.

Admiral TAYLOR. No, sir; as long as you make planes out of wood.

Mr. FULLER. You do not make them out of wood, do you?

Admiral TAYLOR. Very largely.

Mr. FULLER. I thought you were having a most terrible time getting the particular kind of Irish linen that was needed, and of waterproof glue, and all those things. It seems to me all those things were just as much complicated.

Admiral TAYLOR. We used to use Irish linen, but we have used cotton for some time. We developed during the war a cotton fabric which is entirely satisfactory, and we have a satisfactory glue.

Mr. FULLER. Without going into details, my point was that there probably were as many complications about the plane as the engine that we should anticipate and be prepared for as far as possible.

Admiral TAYLOR. As far as the plane is concerned, there are very few special tools required.

Mr. FULLER. I had in mind the great plants which took months to get into production.

Admiral TAYLOR. The Victor plant made parts in large production.

Mr. FULLER. How soon were they in production?

Admiral TAYLOR. They began producing parts in a couple of months. It was not a question of tools; it was a question of learning how. They had the tools; they used the same tools they had all the time.

Mr. FULLER. I would like to have you tell us where these activities could be combined, if at all. Do you think it is at all practicable to have a centralized engineering department where all three branches of the service could place their orders, as you now place them outside?

Admiral TAYLOR. I think we would very soon have exactly the same results that Great Britain had, that you would find large numbers of people coming to you gentlemen and saying these Government engineers are hidebound and ignorant, that they are holding back development and are generally worthless.

Mr. FULLER. It would not make much difference what they said if we had a practical working scheme.

Admiral TAYLOR. I think there would be a great deal of truth in what they would say.

Mr. FULLER. You said, however, as a result of your experiments you can do your experimental work better and cheaper than you can have it done by outside concerns.

Admiral TAYLOR. The experimental work we can do better and cheaper in some cases, yes. But we do not feel that we can do it all. We try very hard——

Mr. FULLER (interposing). It struck me that the outside work you were having done was more a matter of diplomacy rather than anything else, because you felt that you could do it better and cheaper.

Admiral TAYLOR. Not at all; it is a question of policy.

Mr. FULLER. Tell me, is that sound, is that good, is that desirable? My picture of that is this. If we put the work outside, on that basis we could have people ready to go on at any time, and that means that we are going to be put in a position of making continual appropriations.

Admiral TAYLOR. Not at all. I was not thinking of the question of production, but of the question of designing and engineering. We

can not take all of the engineers of the country and put them into the Government service. We must have outside engineers; we can not control the inventive talent.

Mr. FULLER. Could we not arrange to have them in consultation?

Admiral TAYLOR. We could, but we would not get anywhere. A man has to have a personal interest.

Mr. FULLER. Do you think if we placed enough orders we could enlist their interest and cooperation?

Admiral TAYLOR. We have had no very great difficulty in the last year in enlisting the interest and cooperation of outside people.

Mr. FULLER. It seems to me you would have to have quite a large contract to interest the Ford Co.

Admiral TAYLOR. The Ford Co. is not building airplanes.

Mr. FULLER. Or take airplane engines; it seems to me the same thing would apply. Take the Fisher-Body Corporation. You have got to place a pretty large order with the Fisher-Body Corporation to interest them in production, in competition with their business in making the vast number of bodies which they make to-day.

Admiral TAYLOR. They are out of the business, and I do not think Congress is going to make sufficiently large appropriations, at least in the next few years, to interest people of that kind.

Mr. FULLER. I am trying to get an idea from you as to how large an order would have to be placed to get the interest of the people outside. It seems to me a centralized engineering department would invite those engineers in consultation, and they would come and talk, and it would be much more effective than for you, for instance, to go to the Fisher-Body Corporation and figure out how large an order you must give the Fisher-Body Corporation to interest their engineers.

Admiral TAYLOR. I was not thinking of the Fisher-Body Corporation or the Ford Motor Co.

Mr. FULLER. Take anybody you like.

Admiral TAYLOR. I was thinking of the airplane designers. There are a number of people doing airplane work. There are the Curtiss people, who have had a large experience and who are always ready to undertake development. Then there are the Gallaudet people whom we are placing experimental orders with. Then there is Mr. Loening, with whom we placed an order for a number of planes. We also arranged that we should build a certain number of planes of his design in our factory. Mr. Loening is a very competent aeronautical engineer. We gave him an order. In some instances, he has had a good deal of the detail work done by other concerns, and was able to assemble planes with a very small plant and very little overhead.

Mr. FULLER. Then with regard to engineering you would say the Navy should do all its own work except such as they do outside?

Admiral TAYLOR. Yes; that is, we should place contracts, and also do work ourselves.

Mr. FULLER. Do you think all this should be absolutely independent of the Army or the Post Office Department?

Admiral TAYLOR. No, sir; not independent at all. There should be, as at present, close cooperation and coordination between the Army and the Navy.

Mr. FULLER. As far as the law goes you are absolutely independent; you can conduct your business absolutely independent.

Admiral TAYLOR. I think it would be desirable for Congress, instead of rainbow-chasing, providing for a large outside body, to legalize the body now in existence and give it the powers necessary. It is working well, and it is going to work well in the future. It is, of course, susceptible of a great deal of improvement.

Mr. JAMES. Is the Secretary of War aware that such a body is operating?

Admiral TAYLOR. I presume so. He not only authorized it, but the first meeting of that board was held with the Secretary of War and the Secretary of the Navy present.

Mr. JAMES. Is the Assistant Secretary of War, Mr. Crowell, aware of the operations of such a board?

Admiral TAYLOR. I am sure I do not know.

Mr. FULLER. What is the name of that board?

Admiral TAYLOR. The Aeronautical Board. It started as a joint board, but it was thought that the title was liable to cause confusion.

Mr. FULLER. Where does that board meet?

Admiral TAYLOR. In Gen. Menoher's office.

Mr. FULLER. Who are the members of that board?

Admiral TAYLOR. There are three members from each service, and a working member from the Army and the Navy. The members of the working committee are not members of the board.

Mr. JAMES. Mr. Crowell appeared before the committee within the last week, and Gen. Menoher also appeared before the committee within the last few days, and both of them seemed to be in favor of this bill, with some slight amendments. I was wondering, under those circumstances, if they considered that the bill would work out and that it would be entirely satisfactory with the amendments they suggested, why both of these gentlemen ask us that we report out one of these two bills, in view of what you have said about this board.

Admiral TAYLOR. I do not know anything about Mr. Crowell, but I am on a board with Gen. Menoher which had this matter up only yesterday. We had a discussion of this whole question, and if I am not very much mistaken, Gen. Menoher was in favor of the liaison being handled by the Aeronautical Board. Certainly in that discussion he stated that that should be done, that the board should be legalized and given necessary powers.

Mr. FULLER. It is my recollection that this matter is handled in some such manner in France.

Capt. CRAVEN. They have what they call the Section Technique.

Admiral TAYLOR. It was not handled that way last April, because we went into that particularly.

Mr. FULLER. How can we get that information?

Capt. CRAVEN. We can get it.

Admiral TAYLOR. Subsequent to April there was some order issued providing for greater consolidation. But I am positive that at the time we were in France the organization they had during the war was in use. Of course the Army aviation was very much greater than Navy aviation in France. The Navy aviation was a very small factor.

Mr. FULLER. That would be true here, would it not?

Admiral TAYLOR. Yes; for a war in which we had a large Army. The Navy aviation is in proportion to the size of the fleet.

Mr. FULLER. Would what you said about having a number of airplanes in time of peace and in time of war applies to the Navy?

Admiral TAYLOR. I had in mind that the aviation branch or detachment is just as much a part of the Navy as any other branch or detachment, and presumably we will have a Navy suitable for our needs, and aviation should be just as ready as the rest of the Navy.

Mr. FULLER. But that would not apply to our program as a whole?

Admiral TAYLOR. As regards the program as a whole, I can readily conceive wars where we would have no use for Army aviation and you might conceive wars where the Army aviation would be greater, perhaps, than the rest of the Army. The question is very difficult to express an opinion on unless you know what you want to do.

Mr. FULLER. Of course we are just being prepared for an emergency, and it would seem reasonable that we should give consideration to a program which could be rapidly expanded.

Admiral TAYLOR. In the Navy the General Board's policy is to consider all possible emergencies that might arise and not prepare a plan for consideration without knowing what the emergency was going to be. You build a machine to accomplish a certain purpose, and you do not build that machine and then consider the purpose it is going to accomplish.

Capt. CRAVEN. I would like to say, Mr. Chairman and gentlemen, as a preface to my remarks that the fact that the department has not yet authorized or accepted any measure, or recommended any measure as a solution of this problem, which puts me in the position of speaking my own views and expressing my own belief in this matter.

I think Admiral Taylor has expressed my views with regard to production—that is, that the Navy should produce its own machines in time of peace.

I think the problem to-day is more or less experimental. I do not think we are solidified in our ideas at all. We are all decided on one thing, that we should proceed economically and should avoid duplication. That is the wish of everybody. The point is how to get together.

As I understand it, the quantity production of the Navy, at least in time of peace, is going to be small. In the estimates of appropriations submitted recently to the Committee on Naval Affairs we have asked for a total of about 150 flying machines of all designs of heavier-than-air, which is no very considerable number. Included in that number are numerous types of various kinds. A good many of them are experimental, you may say.

The matter of quantity production, however, has got to be considered, and we have to keep it in mind. But in time of peace it is not a matter of urgency in the way that experimental development is an urgency. In my opinion it is far better in developing experimentally, with small production, to have the problems attacked from numerous points along certain parallel lines, with the closest possible cooperation and close coordination. I think it is better to do this than to combine everything under one man. Otherwise we get the domination of one man. He may be wise, he may be progressive, but he may be otherwise.

I think it better to separate in that way at this time. I think it is too soon to get together on a quantity-production basis.

You have mentioned the fact, Mr. Chairman, that we have wasted a tremendous sum of money during this war, which was unfortunately true in both the Army and the Navy aviation service. We spent tremendous sums of money and did not get what we were looking for. But the reason was that we did not know what we were looking for and were not organized to go ahead. We need now to get the materials and the apparatus to develop a definite line of progress.

We need personnel, regularly and properly organized, which will permit us to carry out our experiments. Organization, I think, is the most important thing at the moment.

Having that organization, we can come to you gentlemen and tell you, as the result of our experience and the result of actual practice, that such and such a thing is absolutely necessary for us. To-day, we can not do that in the Navy. The Army has had far greater experience in aviation during this war along practical lines than has the Navy. In the Navy the aviation field which we are now going into in this country was entered only just at the close of the war. A great deal of our work is going to be experimental and we are going to demand many and constant changes in our equipment as we develop it, and hence it is absolutely necessary, to my mind, to keep the work of the development of our machines in our own hands for the present.

Mr. FULLER. What do you mean by "our own hands"?

Capt. CRAVEN. In the Navy's hands. I would like to submit to the committee my own thought in this matter, having it clearly understood that it does not represent the opinion of the department or of any other responsible person.

My thought is and has been for a long time that cooperation between the Army and Navy, while fair to-day, could be improved. Gen. Menoher, the head of the Aeronautical Board, also the senior representative of the Army on the board, and I, the senior representative of the Navy on that same board, fully realize that we could get together more closely and should be absolutely together on the matter of development, invention, and production. It is up to us to take the steps necessary to avoid duplication in every way, and that is our purpose.

As you know, gentlemen, those at the head of a governmental activity are not always able to do exactly as they wish. Subordinates have authority and sometimes they do not accord quite as well as the head. My thought with regard to this particular board is that it is now working better than it ever has in the past. It has only recently become a very active body, although it has been in existence for a long time. My idea is that the board should be legalized now and given certain definite legal functions and a legal status.

It should be mandatory that every item presented to this Congress in the estimates for aviation submitted by the Army and the Navy should have first been gone over carefully by that board and that that board should satisfy itself that duplication has been eliminated, and all matters of investigation and production should each and every one be placed in front of that board, and that board should be charged with responsibility for the elimination of duplication. It is primarily, we may say, a matter of good will between the serv-

ices and branches of the services. The board is ordered by the War Department and the Navy Department, and the Secretaries of the War Department and the Navy Department have brought the members of the board together and explained what the duties of the board should be, and we of the board understand what our duties are. At the same time I feel, however, that there is not enough legal responsibility placed on that board to prevent duplication, which is something you desire to avoid, and which none of us desires to foster. We are looking toward cutting down expenses and are looking for improvement in efficiency. A simple way to cut down expenses and avoid duplication is to legalize that board and hold the members of the board to certain definite legal responsibilities, so that a man is compelled to accept his responsibility as a member of that board to the law as well as to the service to which he belongs.

Another thing which I have definitely in my mind is that in some department of this Government, somewhere—I question the necessity at this time for creating a new department, and it seems to me the Department of Commerce is where it can best go—there must be a body created which will have cognizance of civil aviation in this country.

Undoubtedly, as time passes the work of that body will become more definite and will broaden. I can not see exactly to-day, as Admiral Taylor has said, definite uses in a wide sense for civil aviation; but I believe that in the future we will have such development. Therefore, it seems to me that to-day we should formulate somewhere a scheme for taking care of that growth before it comes. So my thought is that at this time under a department of the Government, preferably the Department of Commerce, a small organization should be created which would care for civil aviation. The Department of Commerce then would be responsible for the laws of navigation of the air and the licensing of pilots, the inspection of machines, the laying out of routes, and the coordination of the various present activities which exist in industrial aircraft. I think the business of that body will grow up slowly with the industry. That is usually a satisfactory plan to follow.

I think, with these two details cared for, at the present time it would be well to stop and let development show something definite in the next two or three years, permitting us to tell what the next step should be.

My thought is that if Congress should see fit to-day to organize a new department of the Government and give it a wide latitude, such as is contemplated by this bill, though much narrower than that laid down in the earlier bills, they would go too far at this time. I think all of us in the service appreciate thoroughly the problem and the idea that economy is in order, that avoidance of duplication is essential, that we must take care of the future; and yet I fail to see that one of these measures produced here eliminates that duplication, and I am inclined to think it would to-morrow result in a considerably increased expenditure rather than a reduction of the expenditures of the Government. I do not say, gentlemen, that the future may not produce something of that kind suggested in the bill as being necessary, but I maintain that to-day we have the organization in the Navy, we are trying hard to get on our feet and

the Army is doing the same thing, and what we want is a little stability just at present and an organization worked out along good, firm lines which will allow us to proceed along the lines which we must develop. Such is my thought.

Mr. HULL. There does not seem to be anything in this bill which would carry out your idea. You are impressed with the idea that this board would at once assume a great deal of authority which it would not have to-day. I presume the director, whomever he might be, would be a big man, and he would have the assistance of the Army and the Navy. Certainly, he would not try to interfere where something was working satisfactorily. He would study the problem himself. That is the idea; and then, gradually, as he saw what was best, he would take over the functions he found it best to take over. Of course, he would have the authority. The trouble to-day is, as was so well brought out by both Admiral Taylor and yourself, that we have no analogy in this case—we have nothing to go by. Committees of Congress can not study the details and go into this work as thoroughly as we ought to do. It has been my thought that if you consolidate it under a head who has control there you have set up a board that would find a way to bring this about. You say the thing is functioning under a somewhat similar organization at the present time. And yet you want that board given authority, and that is just what we are doing in this bill—giving a board authority.

We do not say, you have to do these things. We simply say, you have the authority. The bill expressly provides that if there is anything which the Secretary of War or the Secretary of the Navy want to do, they can apply to the director of aeronautics, and he can allot it to them and let them go ahead.

Of course, it is not expected that a man would go in there and play hari-kari. He would simply have authority to take charge of the supplies—which everybody admits ought to be done—and gradually find out by a process of elimination and study just what that board would do and do better than the two or three boards you have.

Capt. CRAVEN. At the present time, Mr. Hull, there would be only one board if the wishes of the Aeronautical Board are carried out. We have taken steps to dissolve the joint technical board organized during the war, and have one joint board, in order to make the contact closer between the Army and the Navy.

I submit, however, if you give that man the authority, there is no question at all of his exercising it. He would be a poor man on the job if he did not, and you would not put a man in there who did not exercise his authority. The point I raise is this, that at the present time it is more economical to the Government, in my opinion, and apparently in the opinion of Admiral Taylor and in the opinion of other officers in the Navy Department, for the Navy to care for its own production. I have not found anybody in the Navy Department who has had any experience who entertains a different opinion. It is better for the Navy to look out for its own production of airplanes at this time than to turn that business over to another department of the Government, particularly a new department.

Mr. JAMES. Because they can do it cheaper and better?

Capt. CRAVEN. Both. As it stands now, if there is anything which the Army has and which we can adopt for our purposes, we get the

advantage of it. That is distinctly laid down in our instructions. If we desire an Army type of machine of any kind, or an engine suitable for our needs, we first go to our brother service or to the other departments of the Government and get it there, if the other departments are producing it and it is economical for us to go to them for production. At the same time, if the other departments wish things which we are producing and which we have, it is their duty to come to us and to take those things from us. That is the present plan. We have obtained machines from the Army, and we are getting machines from them, and they have procured machines from us and are getting machines from us. Such should be a definite sensible feature of our business.

Mr. HULL. You, of course, understand that what impresses Congress is the fact that we have got to economize. It does not make any difference what the departments want, we have got to cut down, and we have got to cut off at the right place and save as much money as possible. It has occurred to us if we could combine these separate functions and have the scheme worked out harmoniously there would be economy, and as Mr. Fuller has said, in having this consolidation under one head we would get economic results.

A board of Army officers was appointed not long ago and they studied the problem, and they stated that it would take about $300,000,000 for Army aviation.

Capt. CRAVEN. You can get boards that will submit all sorts of figures.

Mr. HULL. That would be appalling when you came to pay the bill. That was to go on for 10 years, and it would amount ultimately, according to their figures, to $3,000,000,000. Those figures are so stupendous that they make you think very hard. This year, I believe, the Army was asking for from $75,000,000 to $100,000,000, but that estimate, I understand, has been cut down. It does seem as if the money used for that purpose, if it was combined in one appropriation and handled economically, would produce results that it would not produce if it was divided among three or four different departments.

Capt. CRAVEN. If you analyze the Army's figures and analyze the Navy's figures you will find that not a very large percentage of the money now appropriated is devoted to the production of machines. I know in our own case a good deal of it—and I think more in the case of the Army, although I can not speak positively in regard to them—is devoted to equipment which we have not in this country, and which we have got to create in this country in order to establish ourselves in aviation. Abroad, we hear of a reduction of their figures for aviation. That is very true. They are able to do so because France, England, Italy, and other countries near the scene of the war all have certain facilities, airdromes, flying fields, etc., which we have never had in this country. My thought is this, that at the present time the first thing to be done is to devote a sufficient time to the study of the problem of aviation and to make the Army and the Navy get down to earth on a plain, common-sense development which they desire and need and must have, and then give them the equipment necessary for their purposes.

As I say, the Army has gone further than we have in the Navy along that line. Of course, I am giving the ideas of a naval officer,

primarily, and I mention the Army incidentally only. Give us the equipment we need and let us set up our organization.

I would hate to see an establishment created now which would hold that development back, and I would hate to see something put into our service such as was put into the British naval service, and that has caused the British naval service the trouble it has had, namely, a united air service.

You have eliminated operation in this bill. And operation is so closely tied up with the development of equipment that I do not think it is wise to separate them at this time. We have in the Navy a good deal of an investment in equipment which you can not scrap; that is, equipment for the creation of machines and handling of apparatus on the ground, which you can not do away with or give to other departments advantageously. You can not turn these over to another service. In the middle of the Philadelphia Navy Yard we have an aircraft factory. We have aviation activities in the navy yard organization which are there and which cost a great deal of money to create. To turn them over to another department of the Government would be very uneconomical.

Mr. JAMES. Is there not there any part of your equipment that could be turned over to a new board or department without doing any injury to the Navy?

Capt. CRAVEN. You mean for manufacturing?

Mr. JAMES. Yes.

Capt. CRAVEN. I know of none. I will ask Admiral Taylor to reply to that question.

Admiral TAYLOR. We have a number of planes and engines in store.

Mr. JAMES. I mean equipment which you have at the Philadelphia yard; machinery and things of that kind. Could not that machinery be shipped here, in case we should organize a new board or department?

Admiral TAYLOR. We could take the machinery out and ship it, of course. But you would have to build a place to put it.

Mr. FULLER. When Capt. Craven speaks about this new board retarding the development of airplanes in the Navy, of course, just the opposite effect is what we desire. And we have tried to avoid the domination of the airplane department of the Army and the Navy by people who were not in sympathy with that work. Perhaps that is a bugaboo that should not be considered. We are anxious to get the greatest expansion and development and utilization of this arm of the service, and at the same time we are trying to find a plan that is economical and efficient.

Capt. CRAVEN. I believe a board of some kind under a department of the Government, starting in a small way will be very helpful to civil aviation, and I believe also that it will be helpful to the Army and the Navy in assisting us.

Mr. FULLER. Could we have an analysis of the plan we have under consideration and the plan that is in operation to see what you are doing? This arrangement of the Aeronautical Board is entirely voluntary?

Capt. CRAVEN. It is ordered by the two departments of the Government represented upon it, the War Department and the Navy Department, and the members are appointed by the respective de-

partments. Our precept was carefully drawn up, passed upon, and approved by the Secretary of War and the Secretary of the Navy, and we have been following a certain policy approved by the departments, as to the activities of the Army and the Navy in aeronautical matters.

Mr. JAMES. Can you insert that?

Capt. CRAVEN. I will insert in the record for the benefit of the committee the policy of the Army and Navy relative to aircraft as approved by the Secretary of War and the Secretary of the Navy. I also submit to the committee a copy of the precept under which the Aeronautical Board operates. You will see that the precept and the policy as submitted by the Aeronautical Board have been very carefully overhauled by the Joint Army and Navy Board. That is a higher tribunal having to do with the coordination of the work of the Army and the Navy, and certain improvements have been made in the policy originally submitted by the Aeronautical Board and certain suggestions have been made with regard to the precept. I would like to read a paragraph from the precept, which is important with regard to the cooperation of the activities of the Army and the Navy. Referring to the duties of the original board, paragraph (*b*) [reading]:

It shall from time to time make recommendations concerning the coordination of the aeronautic work of the Army and Navy which is along similar lines—production, training, operation, selection of aviation bases and sites, purchase of material abroad, etc., and for the coordination of the aviation activities of the Army and Navy with other branches of the Government and civil aviation organization.

I would like to repeat again that which I expressed some time ago, that this should be amplified, the duties of the board should be legalized so that the individual members of the board would have a legal responsibility as well as the moral responsibility which is now theirs. I did not state an idea which is also in my mind, that the good offices of this board and all the information that this board has should be put at the disposal of any other commission—we will call it—or body which is organized in any other department of the Government; it should also be available to any other department of the Government—the Post Office Department or any other department.

Mr. JAMES. But you would still go ahead and manufacture your own machines and buy your own machines?

Capt. CRAVEN. For the present, that is my idea.

Mr. JAMES. We will be glad to have the papers you refer to appear in the record.

(The matter above referred to is as follows:)

JOINT ARMY AND NAVY BOARD ON AERONAUTIC COGNIZANCE,
BUILDING D, SIXTH AND B STREETS NW.,
Washington, D. C., June 20, 1919.

From: Joint Army and Navy Board on Aeronautic Cognizance..
To: The Secretary of War and the Secretary of the Navy.
Subject: Precept for board.
Inclosures: (*a*) Letter 7112-22, October 11, 1916, of Acting Secretary of War recommending the appointment of a joint Army and Navy board to consider the development and use of Zeppelins; (*b*) letter 9185-18, January 31, 1917, of Secretary of War, re increase in scope of study to be made by joint Army and Navy board relative to development of Zeppelin service.

1. The board deems it its duty to bring to the attention of the War and Navy Departments the necessity for having a working body actively employed at this time in the consideration of aeronautic affairs in which both the Army

and the Navy are deeply interested. There are many questions pending now which must be taken up and decided in which both services are concerned.

2. Inclosure (*a*) resulted in the establishment of the joint Army and Navy board for the consideration of the development of a Zeppelin service. Inclosure (*b*) enlarged the scope of the Zeppelin board, which apparently was merged into the Joint Army and Navy Board on Aeronautic Cognizane. The nature and scope of the duties of the joint Army and Navy board are not defined, and the board is handicapped by having no definite precept under which to work. The board recommends that a precept be prepared, and submits the following suggestions as to matters to be included therein:

(*a*) The board shall be composed, for the present, of six members—three officers of the Army and three officers of the Navy, appointed by the Secretary of War and the Secretary of the Navy, respectively, assisted by others, detailed, as necessity arises, upon request of the board. There shall also be a permanent secretary of the board, who shall be an officer either of the Army or the Navy.

(*b*) It shall from time to time make recommendations concerning the coordination of the aeronautic work of the Army and Navy which is along similar lines—production, training, operation, selection of aviation bases and sites, purchase of material abroad, etc., and for the coordination of the aviation activities of the Army and Navy with other branches of the Government and civil aviation organization.

(*c*) It shall make recommendations regarding the action to be taken on invitations of foreign Governments to the Army and Navy to participate in aviation activities abroad, and on invitations of civil organizations to participate in such activities in the United States.

(*d*) It shall have cognizance of the issuing of licenses to civilians to operate aircraft in time of war.

CHARLES T. MENOHER,
Major General, U. S. Army.
GEORGE A. NUGENT,
Lieutenant Colonel, C. A. C.
BYRON Q. JONES,
Lieutenant Colonel, A. E. A.
KENNETH M. BENNETT,
Captain, U. S. Navy.
THOMAS T. CRAVEN,
Captain, U. S. Navy.
LYMAN C. COTTON,
Captain, U. S. Navy.

The Secretary of War and the Secretary of the Navy hereby change the name of the board to the Joint Army and Navy Board on Aeronautics.

Approved:

NEWTON D. BAKER.
JOSEPHUS DANIELS.

JUNE 24, 1919.
To Gen. MENOHER, *President.*
MARCH, *C. of S.*

THE JOINT BOARD.

To: The Secretary of the Navy.
Subject: Policy of the Army and Navy relative to aircraft.
Reference: (*a*) Recommendation of Joint Army and Navy Board on Aeronautics of August 23, 1919.
Inclosure: (*a*) Copy of reference (*a*).

The Joint Board has carefully considered by reference from the War Department the recommendations of the Joint Army and Navy Board on Aeronautics, proposed policy of the Army and Navy relating to aircraft, reference (*a*), and has reached the following conclusions:

(*a*) The policy therein recommended is defective in wording in that it is subject to improper interpretation and is expressed in such a manner as practically to prohibit the proper cooperation between the Army and Navy air services, and to seriously interfere with the initiative of each air service when

such air service is conducting operations in which no cooperation with the other air service exists.

(*b*) The statement of the functions of Army aircraft is so expressed as to indicate a prohibition of the use of Army aircraft in attacks on enemy vessels. Such prohibition is believed to interfere with the proper use of aircraft by the Army in its legitimate function of coast defense. The functions of aircraft are dependent upon the functions of the Army, Navy, or Marine Corps, according to which branch the aircraft belong, and there should be no provision in the policy which will limit the use of any type of aircraft or weapon used from aircraft, which can be successfully employed in the accomplishment of such functions.

(*c*) The policy of the War and Navy Departments relative to the tactical and strategical functions of aircraft, and the location of air stations, are so intimately connected with joint operations of the Army and Navy and so directly affected by national strategy that any questions relating thereto should be referred to the Joint Board for recommendation.

(*d*) The name Joint Army and Navy Board on Aeronautics tends to confusion with the Joint Board.

(*e*) That new types of aircraft, such as the rigid dirigible, and new weapons to be used from aircraft, such as the torpedo, should be developed by one service only.

2. The Joint Board submits herewith a statement of a proposed departmental policy relating to aircraft which is recommended as a substitute for reference (*a*).

P. C. MARCH, *Senior Member.*

THE JOINT BOARD, WASHINGTON—POLICY OF THE ARMY AND NAVY RELATING TO AIRCRAFT.

1. Aircraft to be used in the operations of war shall be designated:

(*a*) Army aircraft.

(*b*) Navy aircraft.

(*c*) Marine aircraft.

Army aircraft are those provided by the War Department and manned by Army personnel.

Navy aircraft are those provided by the Navy Department and manned by Navy personnel.

Marine aircraft are those provided by the Navy Department and manned by Marine Corps personnel.

The Marine air service is a branch of the naval air service.

2. The functions of the Army, Navy, and Marine aircraft are as follows:

3. *Army aircraft.*—Operations from bases on shore, (*a*) as an arm of the mobile army; (*b*) against enemy aircraft in defense of all shore establishments; (*c*) alone or in cooperation with other arms of the Army or with the Navy, against enemy vessels engaged in attacks on the coast, such as (I) bombardment of the coast; (II) operations preparatory to or of landing troops; (III) operations such as mine laying or attacks on shipping in the vicinity of defended ports.

4. *Navy aircraft.*—Operations from mobile floating bases or from naval air stations on shore, (*a*) as an arm of the fleet; (*b*) for overseas scouting; (*c*) against enemy establishments on shore when such operations are conducted in cooperation with other types of naval forces, or alone when their mission is primarily naval; (*d*) to protect coastal sea communications by (I) reconnaisance and patrol of coastal sea areas; (II) convoy operations; (III) attacks on enemy submarines, aircraft, or surface vessels engaged in trade prevention, or in passage through the sea area; (*e*) alone or in cooperation with other arms of the Navy, or with the Army, against enemy vessels engaged in attacks on the coast.

5. *Marine aircraft.*—The functions normally assigned to Army aircraft shall be performed by the Marine aircraft when the operations are in connection with an advance base in which operations of the Army are not represented. When Army and Marine aircraft are cooperating on shore, the control of their operations shall be governed by the One hundred and twentieth article of war, United States Army.

6. The functions of aircraft assigned under Army (*c*) and Navy (*e*) are a duplication of functions. In such operations cooperation is vital to success. Such cooperation shall be governed by the following provisions:

(*a*) The naval district forces, vessels, and aircraft, will never be strong enough to prevent an attack on the coast by major units of the enemy fleet. When, therefore, an enemy force of a strength greatly superior to that of the naval force available for use against it, approaches the coast, the commander of the naval force shall inform the commander of the Army department of the situation, shall assume that the Army has a paramount interest in the operation, and shall coordinate the operations of the naval forces with those of the military forces.

(*b*) If, however, the conditions are such that the enemy is, or can be, engaged by a naval force approximating in strength to that of the enemy, the commander of the Army department shall be so informed and he shall assume the Navy has a paramount interest in the operation and shall coordinate the operations of the military forces with those of the naval forces.

7. The functions of aircraft above assigned shall govern in the production of aviation equipment, training of aviation personnel, and establishment of air stations for the War and Navy Departments. Such assignment shall not prevent the employment of Army and Marine aircraft in naval functions upon the request of the senior naval officer present, or vice versa, the employment of naval aircraft in Army functions upon request of the senior Army or Marine officer present on shore; nor shall it prevent the employment of Army, Navy, or Marine aircraft when no other air service is cooperating in the operation in any manner which shall be most effective in accomplishing the mission of the force.

8. All questions regarding the policy of the War and Navy Departments with regard to the tactical and strategical functions of aircraft, and to the location of air stations, shall be addressed to the joint board for consideration and recommendation to the Secretary of War and the Secretary of the Navy.

9. The name of the board now known as the Joint Army and Navy Board on Aeronautics is hereby changed to the Aeronautical Board.

10. To prevent duplication, and to secure coordination, plans of new projects for the construction of aircraft, for experimental stations, for coastal air stations, and for stations to be used jointly by the Army and Navy, or for extensive additions thereto, shall be submitted to the Aeronautical Board for recommendation.

11. The development of new types of aircraft, or of weapons to be used from aircraft, so far as practicable, shall be assigned to and carried on by one air service. This restriction shall not prevent the employment by either air service of any types of aircraft or weapons, which, after development, are considered to be necessary for the accomplishment of its functions. Questions relating to the development of new types of aircraft or weapons to be used from aircraft shall be referred to the Aeronautical Board for recommendation as to which air service shall be charged with the development.

12. All information pertaining to experiments in connection with aviation shall be exchanged promptly between the Army and Navy air services.

13. Whenever possible, training and other facilities of either air service shall be made available for, or be used by, the other service.

14. Before arranging to purchase aircraft, each service shall attempt to secure aircraft of the type desired from or through the other service.

15. In the interest of economy, heavier-than-air craft shall be provided in preference to ninrigid, semirigid, or rigid dirigibles whenever the former can satisfactorily perform the services required.

16. All estimates of appropriations for the Army and Navy aviation programs shall be presented to the Aeronautical Board for review and recommendation before submission to Congress.

P. C. MARCH, *Senior Member.*

NAVY DEPARTMENT.

Approved December 27, 1919.

JOSEPHUS DANIELS,
Secretary of the Navy.

Mr. JAMES. You referred to the licensing of pilots. Of course, that is very important, but we are studying the matter from the standpoint of saving money. At the same time we do not want to do any great harm to the Army or the Navy. If we should put in a proviso something like that suggested by Mr. Praeger in section 3, line 20, page 3, amend the section so that it will read in this way, beginning with the last word on line 18, "to design, manufacture, purchase, assemble, produce, and provide such type of aircraft as in the judgment of the Secretary of War, the Secretary of the Navy, and the Postmaster General will most meet the needs of their respective services," in what way would that hurt your department?

Capt. CRAVEN. At the present time the Post Office Department can very well make that suggestion because it has no established organization for the production of flying craft. It gets them, I presume, by contract, and also by cession from the Army and from the Navy. We in the Navy, as you gentlemen understand, have a bureau system, and in matters of production the specific details are looked out for under the different bureaus as that an organization exists. If you build up another organization in the Government to take care of naval aviation now, for the production of machines and appliances, naturally you are going to duplicate the functions now exercised by some of these bureaus. You can not avoid it, and you are going to create an additional overhead, and as I have already stated I believe that economically a mistake will be made.

Mr. FULLER. Under your present plan what is to prevent the Navy Department from negotiating, let us say, for 20 planes and practically at the same time the Army is negotiating for 20 of the same type of plane, and then we find out afterwards that had the order been combined or some other arrangement made it would have been more economical.

Capt. CRAVEN. Exactly; that is the thought that Gen. Menoher and I have discussed many times about particular types of plane; that has been done; the Army has been played off against the Navy. We could to-day go to a manufacturer and he would say he will let you have 20 planes for so much money, and if you get a hundred the price will be so much. It should be the duty of the aeronautical board to study every item which appears in the estimates of the Army or the Navy. The estimates should be analyzed. Before being presented to Congress they should be so analyzed or so broken down that a comparison can be made, and it can be said that the Army is going to get so many planes of this type and the Navy of that type. It should be the duty of the board to study these things and compare and see that matters of that kind are looked out for. At the present time—I have read you the broad expression of our precept, as we understand it—we endeavor to carry out this idea. We have saved a great deal of money in the figures submitted to Congress in the naval estimates and also some in the Army estimates, although up to the present we have not gotten the Army estimates in such definite shape as our own, as they do not make them up in exactly our way.

To my mind, if this board is properly handled and does its work thoroughly, inadvertencies of that kind should be completely avoided and it should be the duty of that board to obviate such things.

Mr. FULLER. Could we not have as the chairman of that board a man who would have particularly in mind the matter of coordinating the efforts of the two departments?

Capt. CRAVEN. Do you mean somebody——

Mr. FULLER (interposing). Somebody who would have especially in mind that matter of economy and efficiency rather than being an Army man or a Navy man primarily, and with the idea that he should look out for both interests.

Capt. CRAVEN. It could probably be worked in a dozen different ways; but I submit that unless you can get the officers in these positions who are keenly interested in doing their full duty, you will not have cooperation, regardless of the organization.

Mr. FULLER. Do you feel at the present time that you would be advised of any order given by the Army so you would know whether the same order that you might be intending to give was given in the Army?

Capt. CRAVEN. I think both Gen. Menoher and myself are very much interested in seeing that such information is in front of the board. I know in the past that has not been the case.

Mr. FULLER. How can we guarantee it in the future?

Capt. CRAVEN. The only way to guarantee it in the future is to put it in the law and say that it shall be done. That is to my mind the only guaranty you can have. Otherwise, any bureau of our department or any office of the Army can withhold certain information.

Mr. FULLER. Is there a chairman of this board now?

Capt. CRAVEN. The senior member, Gen. Menoher, is the chairman of the board. It is composed of three officers of the Army, three officers of the Navy, a secretary from one service or the other—at the present time from the Army—and two officers, one from the Army and one from the Navy, to act as a working committee. The working committees will be increased in the near future because of the increased activities of the board, on account of taking over the duties of the former technical board.

Mr. FULLER. The development of the present board would be for the purpose of preserving to each department control of what it wants, and at the same time to economize?

Capt. CRAVEN. Yes, sir. There we have an experience which we can look to, year by year. We know the board has not functioned correctly in the past, but it has improved all the time. I see a definite line of improvement for that board. By making the experience of that board available for other departments of the Government and letting them take counsel of the board and profit by their work, that board can help other departments. That board, of course, we assume has all the information of both departments of the Government before it.

Mr. FULLER. That is about the airplanes?

Capt. CRAVEN. Yes; and the Post Office Department can come to this board——

Mr. FULLER (interposing). Does it have that information now?

Capt. CRAVEN. It is supposed to have it, but because of lack of well-defined organization up to the present time we have both been seeking the light, more or less, and there has been some uncertainty, perhaps, about the information.

Mr. JAMES. Admiral Taylor said that in giving small orders for airplanes you have to pay more, or else the Government has to assume the insurance?

Capt. CRAVEN. Yes.

Mr. JAMES. Suppose the Navy had a small order for a particular kind of machine and placed it with a certain firm, and at the same time the Army wants that same kind of machine, and also places a small order for that same machine; is not the Government being hit both ways, and if you had this organization proposed in this bill would not both orders have been consolidated, and would not the Government have gotten the advantage of a better price for a larger order?

Capt. CRAVEN. A very difficult thing is to get half a dozen men to make up their minds that they want the same thing at the same time. If you can get the Army and the Navy to say that they want the same type of machines at the same time, it would be very easy to do that.

Mr. JAMES. But so far as the appropriation is concerned, it is not as if the Army got its appropriation on the 1st of July and the Navy got its appropriation on the 1st of December. Both the Army and the Navy have their appropriations available the 1st of July.

Capt. CRAVEN. I submit if those matters are passed over the table of a board such as we have, and that board should be legalized, duplication of that kind on contracts which are disadvantageous to the Government should be obviated.

Mr. FULLER. It would seem to me that a man at the head of that work, independent of either branch of the Government, could better coordinate and devote himself to accomplishing that result than if you put an Army man or a Navy man in charge of it.

Capt. CRAVEN. You get there the difference between organization and administration. You can, of course, take the best organization in the world and wreck it by poor administration.

This is a matter, as Admiral Taylor has suggested, and as you gentlemen seem inclined to accept, which looks to us as though for the immediate future the activities of the Army and the Navy, for some time to come, are going to be the principal ones as far as aviation is concerned. Here is an Army and Navy project, an Army and Navy machine, and I think if it is administered properly it will work out properly as an Army and Navy machine. It looks to me as though it is the simplest thing you can get. It would not involve any additional expense that I know of; as a matter of fact, it would result in a reduction in expenditure.

Mr. FULLER. Without antagonizing either department, would it be possible for them to choose someone who is going to devote himself to combining this work?

Capt. CRAVEN. I think it could be done, but it is a question of whether or not it is desirable.

Mr. FULLER. It is satisfactory to the Navy to have an Army man in charge of it?

Capt. CRAVEN. Yes, sir.

Mr. FULLER. You think the work would be developed as well if it were done in that way as it would by having one man who devoted himself entirely to it?

Capt. CRAVEN. Yes; I think the two branches should work together. This board coordinates the governmental activities here.

If there were real commercial aeronautic progress going on in the country the last thing they would want would be governmental supervision. To meet the present situation we should and must assist civil aviation, not only in performance but in the establishment of an industry, and that assistance should come through a body which we suggest should be in the Department of Commerce. There you could have a director of aviation, or whatever you choose to call him, with his assistants and he would control civil aviation. He would have the facilities and information and organization of this board at his command or at his disposal. To my mind, it seems best to leave the board purely as a board of Army and Navy officers. I do not see any good reason for changing it or increasing the membership

Mr. FULLER. If you can get the results.

Capt. CRAVEN. I believe you can get the results. Of course, after all, it depends on the personnel. I believe it is quite necessary to make that board a legal body, organized with definite functions, so that you have definite responsibility, and so that Congress can go to that board and demand an explanation of why duplication has occurred, if such duplication does occur.

Mr. FULLER. My theory would be that if you want to develop a certain line of work you would make it into a department and put somebody in charge of it.

Capt. CRAVEN. Yes.

Mr. FULLER. You would do that in a dry goods store, and it would seem to me the same thing would apply to larger activities.

Capt. CRAVEN. Here you have the work of the Army and the Navy, and here is a body which coordinates the two. That seems to me to be the simplest way to do it. It may not be a final solution of the problem, but that is as wise a measure as can be adopted at this time in the interest of economy and progress.

Mr. FULLER. How can we assure that coordination to the highest point?

Capt. CRAVEN. If you legalize that body, and then if they do not "carry on" you have something besides the Army or the Navy regulations to go on. That is simply my thought about it.

Mr. JAMES. I did not hear your testimony when you appeared before the subcommittee some time ago. Was there anybody connected with the Navy at that time who was in favor of a separate air service?

Capt. CRAVEN. There are very few officers in favor of it.

Mr. JAMES. Were there any flying officers in the Navy who approved of a separate air service?

Capt. CRAVEN. There are about 50 regular naval officers who are flying officers, and there are four or five of them who have ideas along that line, because they have been dissatisfied in the past with the way the Navy has taken care of the service.

But there is a strong consensus of opinion in favor of the Navy having its own aviation. Of course, the young men who came in during the war, many of whom would like to remain, but who are disinclined to accept the idea that they should qualify as regular naval officers, are, I think, in favor of a separate air service; that is, those who do not understand the requirements of the Navy.

(Thereupon the subcommittee adjourned.)

UNITED AIR SERVICE.

FEBRUARY 3, 1920.

STATEMENT OF BRIG. GEN. WILLIAM MITCHELL, ARMY AIR SERVICE.

Gen. MITCHELL. I brought up a lot of simple diagrams to illustrate the points which we have been discussing.

Mr. JAMES. Your testimony now is in reference to H. R. 12134, introduced by Mr. Hull?

Gen. MITCHELL. Yes, sir.

Mr. JAMES. Have you ever given any attention as to whether or not we could save any money by having a separate air service?

Gen. MITCHELL. We will save, I believe, from 20 to 30 per cent as judged by flying equipment and efficiency, if the money could be made available for a department of areonautics right now; that is, the unexpended balances for the War, Navy, and Post Office Departments.

Mr. JAMES. You remember that I asked Gen. Menoher that question, and he said he had not gone into the figures.

Gen. MITCHELL. We can show it quite clearly.

Mr. JAMES. I think it would be a good thing if you were to get up a statement along that line, and put it in with your testimony.

Gen. MITCHELL. All right, sir; I have a statement.

Mr. JAMES. Because I have heard several times that we would save money, and I have heard that we would lose money, and I think a statement from your department as to how much we could save would be of use to us, not only on this bill, but also on H. R. 11809, introduced by Mr. Kahn, that we will have up in the near future.

Gen. MITCHELL. The statement has to come from me personally, substantiated by other things. I can not answer for the department.

Mr. JAMES. You will include that in your statement.

Gen. MITCHELL. Yes, sir; I can put that in.

(The statement referred to is as follows:)

(A) COAST DEFENSE.

1. The following amounts would be saved in the cost of maintaining an efficient coast defense, aviation, by consolidating the Army and Navy Services. This saving would result from the reduction in the number of stations which would be maintained by the Army and Navy, respectively, should they operate separately.

2. The Navy have and are projecting a system of stations on the coast, designed for the purpose of maintaining coast patrol with flying boats and seaplanes, and providing bases for the Aviation units assigned to the fleet.

3. The Army are maintaining and projecting, with money already appropriated by Congress in the fortifications bill, a system of stations designed for the purposes of protecting the principal cities from attacks by hostile

aviation, regulating the fire of the coast defenses, and making such surveillance patrols as would be needed by the Army commander.

4. It will be possible to operate both land and water planes from the Army stations, but it will not be possible to operate land planes from the Navy stations. Due to this fact, in a combination of the services, it would seem advisable to eliminate many of the Navy stations, because they do not, as a rule, provide for the operation of land planes, whereas the activities now being carried on at certain naval stations can just as well be carried on from the Army stations with the consequent reduction in overhead. The following Navy stations may be eliminated or consolidated with respective Army stations indicated below:

NAVY.	ARMY.
Rockaway.	Newdorp, Staten Island.
Yorktown.	Langley Field.
Hampton Roads.	Langley Field.
Coco Solo, Canal Zone.	France Field, Canal Zone.
Anacostia, D. C.	Bolling Field, D. C.
New London, Conn.	Stonington, Conn.
Dutch Flat, Calif.	Rockwell Field, Calif.
Boston, Mass.	Weymouth, Mass.
Narragansett Bay.	Kingston, R. I.
Culebra, Canal Zone.	Balboa Fill, Canal Zone.
Portsmouth, N. H.	Portland, Me.
Hawaii.	Ford Island, Hawaii.
Philadelphia aircraft factory.	Army factories and experimental stations.

5. The details of the amounts saved on the above stations follow:

Station.	Maintenance and repair of equipment.	Maintenance and repair of buildings and grounds.	Additional construction at stations.	Saving due to reduction in personnel necessary to operate.[1]
Rockaway	$155,000	$60,000	$184,000	$282,000
Yorktown	10,000	10,000	25,000	60,000
Hampton Roads	272,000	110,000	475,000	402,000
Coco Solo	115,000	20,000	.....	170,000
Anacostia	62,000	18,000	.....	105,000
New London, Conn	2,600	5,000	37,000	[2] 33,000
Dutch Flat	106,000	.....	214,000	[2] 276,000
Boston	3,200	5,000	214,000	[2] 33,000
Narragansett Bay	1,300	10,000	120,000	[2] 33,000
Philadelphia	[3] 220,000	125,000	110,000	.....
Culebra	5,300	5,000	95,500	[2] 66,000
Portsmouth	1,300	5,000	.....	[2] 33,000
Hawaii	.....	.....	1,000,000	[2] 132,000
West coast dirigible station	.....	.....	2,775,000	.....
Total	953,700	373,000	5,249,500	1,625,000

[1] In arriving at the saving indicated, an average cost of $1,200 for pay, food, and clothing of enlisted men has been used and an average pay of $3,000 for officers. Further, only the number of men which would be saved by a consolidation is used as a basis, not the number of men which would probably be assigned to the Navy station, which in most cases is at least double the amount used in arriving at the figures in the above total.

[2] No estimate of the number of men probably assigned to these stations by the Navy has been obtained. The figures are based on the least possible number which could accomplish the work planned.

[3] The estimate expenses on maintenance and equipment at Philadelphia are $440,000. It is figured that only half of these expenses would be eliminated, and accordingly only $220,000 has been entered above.

(B) Experimental.

1. Both the Army and Navy are maintaining and continuing experiments. So long as these experiments are for separate services it is difficult to eliminate duplication; but by a combination of services the following duplication may be eliminated:

(*a*) Investigation of materials used for construction of aircraft ___ $1,000,000
(*b*) Development of aviation instruments (50 per cent saving) ___ 50,000
(*c*) Investigation of material used in construction of engines _____ 167,000

(*d*) Development of engines	$500,000
(*e*) Development of aircraft (50 per cent saving)	750,000
(*f*) Miscellaneous experiments at air stations	137,000
Total	2,604,000

(C) AVIATION SCHOOLS.

1. In the operation of aviation schools there has already been an elimination of duplication by the Army undertaking to train the Navy pilots in the operation of land machines. Due to this elimination, $500,000 was struck out of the naval estimates by the Joint Army and Navy Board. This figure is merely a tentative figure, however, as the amount of saving involved depends to such a great extent upon the extent of the program considered.

(D) GENERAL OVERHEAD.

1. It is rather difficult to estimate the actual saving which would result in the combination of operation, production, supply, and general maintenance of equipment, by consolidation of the services, due to the fact that no definite program has been approved for either service, and the percentage of saving on the above items depends upon the size of the respective services considered.

2. Based on the size of the present services there would be a 10 per cent saving in operation, due to decrease in the personnel needed to accomplish the given result, which would be obtained by the greater flexibility in assignment.

3. A 50 per cent saving would be obtained in overhead necessary to oversee production of equipment. A 5 per cent saving would probably result due to the placing of consolidated contracts.

4. Probably 20 per cent saving would be secured in the cost of furnishing supplies, due to decrease in operating personnel, size of stocks necessary to be carried, etc.

5. Very little saving in maintenance and equipment would result due to consolidation of the present establishments, except as obtained by the consolidation of stations; but with extended operation of land planes by the Navy there would be at least 20 per cent saving in the maintenance of equipment.

Totals, coast defense:		
Maintenance and repair of equipment	$953,700	
Maintenance and repair of buildings and grounds	373,000	
Additional construction at stations	5,249,500	
Saving due to reduction in personnel necessary to operate	1,625,000	
		$8,201,200
Total experimental		2,604,000
Total aviation schools		500,000
Grand total		11,305,200

	Per cent.
Operating personnel (present establishments)	10
Procurement and production	50
Supplies	20
Maintenance and equipment	20
Maintenance of airdromes and ground organization throughout United States and overseas possessions	50
Combined meteorological organization	50
Combined radio and communication organization	50

The increase in the efficiency of a well-trained personnel for handling an air service can not be calculated, but would result in a great saving. This would be accomplished by a united air service.

In addition, the following Government and civil agencies are concerned more or less with aeronautics, which lead to increased expense and considerable confusion in all aeronautical work:

GOVERNMENT AGENCIES COOPERATING IN AERONAUTICS.

Aeronautical Board, Washington.
Army Air Service Experimental Laboratory, Dayton.
Bureau of Entomology, Washington.
Bureau of Fisheries, Washington.
Bureau of Mines, Washington.
Bureau of Standards, Washington.
Forest Products, Laboratory, Madison, Wis.
Forest Service, Washington.
Interdepartmental board on commercial aviation.
International Aircraft Standards Board.
Joint board, Washington.
National Advisory Committee for Aeronautics, Washington.
National Research Council, Washington.
Navy Aerodynamic Laboratory, Washington.
Post Office Department, Washington.
Weather Bureau (Washington and principal cities).

CIVIL AGENCIES COOPERATING IN AERONAUTICS.

Curtiss Engineering Corporation.
Leland Stanford, jr., University.
Massachusetts Institute of Technology.
Throop Institute of Technology.
Washington State University.

Gen. MITCHELL. Mr. Chairman, I wish to take this matter up from a little bit different standpoint from that in which it has been handled before the committee heretofore; that is, the standpoint of why we need an air service, what can be done with it, and from that justify the organization that is necessary to keep it up.

The main reason for aviation to-day is as an element in the national defense. That is the primary object in its maintenance. The next purpose is to carry out certain work which the civil department of the Government can in no other way. Aviation has no competitor when it comes to delivering anything at terminal station in the air. A photographic camera for aerial mapping carried to its proper location by an airplane is an example.

Third, we are interested in it from the standpoint of its possible commercial development in the future as a means of communication, both for passengers and freight, between various places that it is difficult to communicate with at present, or as a competitor with railways, steamships, motor and animal transport. The third is the least developed application of aviation. All of these activities of aeronautics dovetail into each other in many ways. One central bureau should handle the general control of aviation from an international standpoint, from an interstate standpoint, and from the standpoint of seeing that the airplanes themselves are safe for flying, both with passengers and with cargo, are safe for going over cities, and that the personnel that operates them are capable of handling them and are in condition to operate them when they take them off the ground.

All of these things have to be looked after in aviation, or the thing can not be properly regulated. We must at the same time be careful of overregulation on the proposition, so as not to hamper development. The only way to insure efficiency in these things is to have the people who are charged with this handling thoroughly conversant with aeronautics. The basis of the whole thing is knowledge of the game.

Now, following that general statement, I would like to call attention to a small diagram that I have here, which shows the uses for which the air service is to be used in the Army, in the Navy, and in the Marine Corps. There are a great many other departments of the Government which, in the future, will use aviation also. The Post Office Department now is coming very strongly with its use of aviation, and I want to make the statement here that I believe that the use of aviation by the Post Office in time of peace is one of our most necessary developments, because they are required to fly on a definite schedule through any and all weather, which is not the case in time of peace with any other branch of aviation, and I believe we should foster the use of aviation by the Post Office Department greatly in that respect.

Now, in these branches of aviation for the Army, Navy, and Marine Corps that are shown here, they duplicate each other in every respect, the three of them, in so far as operations and use are concerned, except in the one branch of observation aviation, which I will show you the nature of by a diagram. There is an absolute duplication all the way through between the Army, Navy, and Marine Corps, in so far as operation and matériel are concerned, with the exception of observation aviation. That amounts at the present time to not over one-twentieth of the total amount of aviation required for national defense in case of war, and, in so far as one-half of observation aviation itself is concerned, that is a duplication also. I will show you why.

The use of aircraft against an enemy may be considered to be divided into three phases: First, the contest for the control of the air. This takes place between pursuit airplanes; that is, the airplanes that have the greatest speed, the greatest maneuverability, and the greatest offensive power against other aircraft. Without an air battle as a preliminary to operations, whether over the water or over the land, to determine whether or not work can be done in the air, neither force, either on the water in case of a navy, or on the land in the case of an army, will ever have a chance with the other, because it will be completely blinded, and, in addition, subjected to the direct attack of the hostile air forces. That is a principle now that is accepted in every country by every service

I would like to have you see what is the difference, whether you fight here over the water or here over the land, in so far as air tactics are concerned. There is no difference whatever. There is absolutely no difference between air tactics in a battle over the water between forces of pursuit aviation and in a battle over the land, absolutely none whatever. Where the necessity for unity of tactical control is necessary is not down here on the land or on the water, but it is there, up in the air. That is where the necessity for unity of control occurs. If you do not get unified forces in the air, in so far as training, equipment, supply, and repair are concerned, you can not develop your full force.

We will suppose that a favorable decision has been obtained in the air by pursuit aviation off our coast, according to plans that are prescribed for the use of the air service the next step is a direct attack on the hostile fleets. I wish to enter in the record here that the air officers all through the world to-day believe it is only a question of a very short time before a navy will have to get under the

water and stay there. Air officers do not believe that fleets of surface vessels will be able to maintain themselves in the face of air attack. The whole emergency appropriation for aviation that we are asking for now for our aviation is only about one-half of the cost of one battleship. Ten bombardment groups of 100 airplanes each, or 1,000 bombardment airplanes, can be built and operated for about the price of one battleship.

Now, the method of air attack against ships on the sea divides itself into three kinds: (1) A direct attack by airplanes using cannon and machine guns so as to occupy and distract the attention of the crews. A ship at sea is very much more easily picked out than is an object on land. A ship can not hide under trees; it can not dig a hole in the ground. It is the easiest thing to pick out that there is. The idea that is projected from some quarters that a man has got to be a graduate from the Naval Academy to be able to see what a ship is would mean that the Coast Artillery would not know what they were shooting at from the shore or that an airplane could not tell the difference between a ship or a railroad train if carried to its logical conclusion. Anybody who is capable physically and mentally of passing the prescribed standards required for the air service can tell, in a very short time, what a ship is on the water and the targets on the water. They are twice as simple as they are on the land. There is no comparison. We would like very much to take the members of your committee down to Chesapeake Bay, to our airdrome there, and show you these things from the air, which we can do at any time, so that you can judge for yourselves.

Now, the air attack on a fleet would be made with cannon and machine guns, so as to interfere with the handling of the ship by having various kinds of projectiles exploding all over it, sweeping its tops, decks, and any unprotected apertures. As far as antiaircraft defense from a ship is concerned, the guns have to be confined to their decks. It is not like the operations we had in Europe, where the antiaircraft cannon and machine guns were all over the whole country. On ships you know exactly where they are, and you know how they are being handled and what they can do; in addition, a ship is constantly moving, which makes a difference in their action.

We then have this attack carried out by groups of airplanes. One hundred airplanes constitute a group. Under cover of the airplane, cannon, and machine-gun attack, an airplane bombardment using projectiles up to 1 ton in weight will be made. These will use in the future burning projectiles, thermite, or something like it, smoke projectiles for covering vessels in their own smoke screen, armor-piercing projectiles, and depth projectiles for bringing pressure against their sides under the water as is being done against submarines. Our chemical warfare people and our ordnance people tell me that those things can be developed successfully. As the late war in Europe, particularly the air part of it, was carried out on land, these things were never gone after with any great degree of effort to solve them. I am confident they can be done.

The third is an attack by water torpedo. We can use our ordinary bombardment airplanes fitted with water torpedo tubes for that purpose, and the fourth is an attack by submarine guided from the air. All of these things can be controlled from a central command on an airplane by radio telegraphy. You can talk to a submarine under

the water now by radio. So much for the air attack. The same general methods of attack can be applied against vessels on the sea as against objects on land. The same general system and the same general equipment can be used. There will be some slight difference in the kind of projectiles that will be used, in the same manner that we would use a different type of projectile if we were attacking the House Office Building here than if we were attacking a kerosene or fuel base of that kind on the outside.

In the nighttime we believe we can have more success in an attack against naval vessels because in that case we can use parachute flares, flaming projectiles, and things of that kind which will blind the crews of the warships and mark them very distinctly as targets, and, in addition, we believe that our own rigid airships can be brought into very close proximity to the naval vessels at night so that they can drop very heavy projectiles, projectiles of very great size if necessary. Vessels will be easy to find with any kind of visibility, particularly because their wake is very plain from the air.

You hear a great deal of talk about not being able to hit certain objects with bombs. That is entirely a question of how close you can get to the object. If we want to hit this building, and we have no aircraft or antiaricraft weapons opposing us, we can come right down on top of it and hit it every time. When you are forced up very high, 15,000 feet or more, as we were often in Europe, the chance of hitting your object becomes very much less. But when you are dropping bombs from a group of 100 airplanes it is very similar to shooting a shotgun at a thing, as distinguished from one shot from a single 22-caliber rifle at a certain distance.

This diagram illustrates what we term "observation aviation." It is the only kind of aviation where specialization is needed between the Army and the Navy; that is, the airplane which regulates the fire, adjusts the fire, either from shore stations, troops, or from a ship. Fire from shore or from a ship will begin at a range of at least 40,000 to 50,000 yards, if not more. We are not entirely familiar with adjusting fire at these long ranges yet, because we have no reference mark in the water. Wireless direction instruments and overs and shorts, rights and lefts from the target is as far as we have gotten. We have in the case of ships two moving objects. That is the only place where real specialization of aviation occurs.

Even in this case the same motors will be used, the same machine guns, probably the same wireless, but the training of the observer will be somewhat different. The observer in observation aviation attached to troops or navies has got to specialize with the kind of thing that he works with on the ground or water. That is the kind of aviation that the Army and Navy are thinking about, primarily, when they talk about its being necessary to have aviation with those respective services, and that is the only one. They look with abhorrence—all navies do—on a system of attack against their vessels by airplanes, because it will mean eventually the diminution or entire elimination of their strength on the water, and many think, therefore, that helping aviation will diminish naval strength.

I will not attempt now to go into detail about this diagram, because it is so complicated, but that shows the use of various branches of aviation at one time in combat. I wish to show you this to give

you an idea of the necessity for the high training which air officers must have. There you have seven or eight different kinds of aviation acting at once, with hundreds of airplanes. This is the actual way we handled aviation in Europe. Any officer who is not a flying officer and who has not had experience in that kind of work can not possibly handle it. If there is one thing that was proved in this war beyond everything else it was that an officer who was not a flying officer was entirely incapable of handling aviation. That was proved thoroughly. It was proved, on the other hand, that any officer who had served and learned thoroughly his duties in the Infantry, the Cavalry, or the Artillery could handle any one of those branches, or all three in combination. Therefore, if you are going to have an air corps, you must have it composed of air officers, otherwise you will never have an air corps. I just mention that to show the necessity for training in that respect. An officer without this training is bound to make a dismal failure of it until he learns.

This diagram shows the use of aviation at night, offensively and defensively. We were very much bothered by hostile night bombardments for a long time, but, due to the fact that we began to fly with practically everything at night, and due to the combination of antiaircraft searchlights, antiaircraft artillery, and pursuit airplanes, the night bombardment was being greatly reduced at the time of the armistice, and the German night bombardment probably would have been entirely stopped in a short time. In order to carry our bombardment aviation into the enemy's country, we had to begin attacking the hostile antiaircraft defenses on the ground with our small airplanes, so as to occupy the enemy while the larger planes went over higher up. I will not go into detail on that, because it is a more or less complicated affair.

Now, in order to use aviation as a national asset you must provide what we call a ground organization, because without a good ground organization aviation can not render its maximum service. Here is a map of the United States with air routes shown that we have already pioneered and flown over. Those air routes which we have mapped out for national defense also may be used by any civil aviation that is provided for. By civil aviation I mean the aviation used by the various civil departments of the Government. These airdromes should also be available for commercial aviation.

The greatest deterring element to-day to commercial aviation is not having a ground organization throughout the country for planes to land on, refuel, and refit. If you have these air routes properly marked, provided with meteorological means, with a system of communication from one to the other, with radio and light aids to navigation, with gas and oil stations, with carbureter and ignition men, and ordinary spare parts in each one that can be furnished at cost, any airplanes using them will be run at least 25 per cent cheaper, because without a good ground organization commercial planes can not operate. Those things can be put into place and maintained by the Government comparatively cheap. Furthermore, the whole system of control of the air, of policing the air, of inspection of airplanes and pilots when they land and when they get off, is inseparably joined up with such a system. The whole thing works right in together for military aviation, for civil aviation, and for commercial aviation.

At the present time, to maintain their organization, the Air Service of the Army has 191 officers on the staff and 1,218 other people in Washington. It is organized as shown on this chart. There is a Director of Air Service, an executive officer, an administration department, an information department, a supply department, and a training and operations department.

Now, that is an administrative staff as distinguished from a tactical staff. The question has been brought up here a great many times about the size of the staff. This one administrative staff can handle every air activity that we have to-day in the United States without any addition whatever, in so far as every function of an air service is concerned. The only staff that would be necessary in case of a united air service under these conditions, with the Army or the Navy or with any other department, would be solely the operations staff for the number of air units, squadrons, groups, etc., that would be on duty in those departments, and it makes no difference in the size of the operations staffs whether those units are on duty with those departments or by themselves. By a consolidation of the various air activities is where you get your big saving in the administrative, engineering, and supply departments. In the Navy, for instance, there are men on the administrative and supply staff scattered throughout all the different departments. They have to maintain the same elements of training, operations, procurement, engineering, and administration, but they are scattered all through the different departments. We have concentrated them more or less into one department in the Army. So much for the personnel part of the proposition.

The greatest single adjunct to aircraft, aside from the motors and the structure of the airplane itself, is the development of ordnance. That is the greatest single element. If you do not have cannon and guns on your airplanes, and you can not meet your adversary either on a parity or in a superior way, he is going to shoot you out of the air. That is the thing that counts. Heretofore we have had to adapt all of our weapons in the air from things that were developed for use on the ground, and my point is that if you put these things into the Air Service you will develop things especially for the air—not only guns, but the means of communication, the special meteorology necessary for aircraft, the photographic equipment, and even the clothing and everything that is connected with an air service.

The whole question about this thing, to my mind, amounts to this: Is an air service of sufficient importance to be developed as a separate arm, or is it still an auxiliary? All the large nations in the world to-day have come to the conclusion that it is a principal arm and requires development in that way, and that it should not be held up and kept back as a subsidiary part of the older services. Even China now has a department of aeronautics. If you want to get at it from the standpoint of what is the greatest economy of effort in so far as financial outlay is concerned and in so far as efficient operation is concerned, I believe you should adopt a system something of this kind. You will have a department of the Government made responsible for aeronautics with an air force under it (and by force I mean a force in a sense that the Army is under the War De-

partment). You will have a section that is concerned especially with supply of all aidcraft and accessories, and you will have a department that is charged essentially with the development of civil and commercial aviation. That unquestionably is the simplest method of handling it. The air force, the supply, and the civil sections should be coordinated under a director.

This talk one hears about air service having to be a part of the Army, Navy, or anything else to be able to operate we know there is nothing to. If an air force is assigned in the same manner that the marines were to the Second Division in Europe, they are going to operate in just as efficient a way from every standpoint; and, furthermore, you will get greater efficiency because air officers will see that their units are made efficient, as distinguished from officers who are only in the air service for a little while and then go back to something else.

In this diagram our coast line is shown. I have the naval air stations here and the Army stations. We can cut down that number more than half and do everything that is necessary to-day and more. There is absolutely no sense, either from a military standpoint, or a financial standpoint, or any other standpoint, for maintaining this duplication all up and down the coast.

Now, I will get down to Mr. Hull's bill. Mr. Hull's bill provides for the supply and some of the civil part of the Air Service without the air force, substantially. That is what this bill provides—I mean in its broad phase. Am I right, Mr. Hull?

Mr. HULL. Yes; that is right.

Gen. MITCHELL. Of course, we believe in having all parts of air activities hitched together, and Mr. Hull's bill is drawn with a view to bringing that about, but I would like to bring attention to two points with respect to this bill, which, I think, were touched on by Gen. Menoher; at least one of them was touched on by Gen. Menoher. We had a great deal of trouble in the Air Service getting the equipment that we wanted with the fighting units. I suppose that a great deal of that was unavoidable, but it has been directly due to the fact that we did not have a corps of trained flying officers. If we entrust the building of airplanes to a department, to which we have not the absolute right to say "You shall or shall not turn that airplane out in production," we are very much afraid—that is, the flying personnel—of the result.

Mr. JAMES. You want to design your own aircraft?

Gen. MITCHELL. No; we want to have it under one department, where the people that have to use the airplanes will say, "We want that kind of an airplane," and the authority will be there to get it. Mr. Hull thinks his bill contains that authority. I am afraid of it for this reason, that the people that are detailed over from the Army under the condition of this bill do not have to know anything about aviation at all, and the people detailed from the Navy under it do not have to know anything about aviation, and probably would not, under the conditions that have obtained in the past.

Mr. JAMES. Your idea would be that the three assistant directors of aeronautics should be flyers?

Gen. MITCHELL. They must be flying officers. No man can know anything about aviation unless he has had air training. It is per-

fectly impossible. By a flying officer, I mean a man who has been brought up through the whole educational system of air work; a man who is capable, for instance, of handling an organization such as I have shown you there. We can show you the qualifications that are necessary and required for our air officers to-day in order to get their ratings as aviators. They are as follows:

JUNIOR MILITARY AVIATOR.

In addition to a physical examination, the examinations in general are as follows:

(*a*) Flying test.

(*b*) Examination to determine knowledge of airplanes and airplane motors.

(*c*) Examination to determine fitness of applicant to hold increased rank if any be involved in the appointment.

The tests under (*a*) and (*b*) will consist of a general practical examination in such of the following subjects as the board may consider necessary, according to the general record and service of applicant:

(A) FLYING.

(1) *Precision landing.*—A. Landing over an obstacle 15 feet high in a field 100 by 800 feet, within 100 feet of a designated mark, 700 feet from the obstacle. Cut motor at 600 feet.

B. Straight landing within 200 feet of a designated mark. Cut motor at 1,200 feet.

C. Make side-slip landing within 200 feet of designated mark.

D. Take off and land across wind.

(2) *Spiral descent.*—A. Climb 1,600 feet, cut motor, descend in spirals, land with dead motor within 200 feet of a designated mark (recording barograph).

(3) *Altitude test.*—Climb to 10,000 feet with service load, rate of climb to approximate chart, performance of airplane used.

(4) *Spirals.*—A. Execute three consecutive figures of eight around pylons 1,500 feet apart without appreciable change in altitude, keeping all parts of machine within a radius of 500 feet from pylon.

B. Execute a series of turns without appreciable loss of altitude, with plane banked to such a degree as to necessitate the use of reverse controls.

(5) *Acrobatics.*

(6) *Cross-country flight.*—Make a triangular flight, landing at each point of the triangle. On this trip compass and map should be used and the candidate should hand in a practical report of his trip including meteorological conditions, compass, courses, etc.

(7) *Formation flying.*—Fly any designated position in a formation flight.

(B) AERONAUTICAL SUBJECTS.

(1) *Navigation and meteorology.*—General principles.

(2) *Airplanes.*—General principles of aerodynamics, nomenclature, assembly, alignment, and structure of airplanes.

(3) *Aviation motors.*—General principle of internal combustion motors, principal types of rotary and stationary motors.

(4) *Examination as to applicant's knowledge of one of the three, pursuit, observation, and bombardment* (which he will be allowed to choose).—For pursuit: The examination will cover duties of flight commander and patrol leader; method of operation on low straffing work, high altitude patrol, and protective patrol; the use of synchronized machine guns, open or closed sight; the value of close formation; time and method of attack, and retreat; use of maps, signals, and making out report. For observation: Infantry liaison, or attack; artillery adjustment; photographic reconnaissance, and surveillance, covering purpose, preparation, result, and report; the use of flexible guns, ring and wind-vane sights. For bombardment: The handling of formation, need for same; flight leading; general principles of bomb dropping; covering sights, bombs, fuses, camera-obscura, and moving carpet; purposes and aim of day and night bombardment; use of flexible guns, ring and wind-vane sights; bomb racks and adjustment of same.

(C) PROMOTION EXAMINATION.

Examination by the board of the applicant's service record, efficiency report, rating card, pilot book, statements of applicant's qualifications from former commanding officers, and such official certificates and records as the applicant may desire to present to the board, and, in addition, such practical questions as the board may consider necessary relative to that branch of the Air Service in which the applicant has served. The weight of the board's decision should, however, be governed largely by the applicant's military history. Greater consideration will be given to satisfactory service overseas in actual combat work than for service within the continental limits of the United States.

MILITARY AVIATOR.

National defense act of 1916 states as follows: "No person shall receive the rating of military aviator until he shall have served creditably for three years as aviation officer with a rating of junior military aviator."

In the examination of junior military aviators for the grade of military aviator, the following rules are complied with:

1. (*a*) A cross-country flight to a point at least 200 miles distant from the starting point, making a landing and return to starting point. This does not preclude intermediate stops on this flight. No passenger of any kind will be taken. Upon arriving at the destination, the candidate will forward a telegram to the president of the board announcing his arrival there, said telegram to be made a part of the board proceedings.

(*b*) Demonstration of ability by the candidate in useful acrobatics in any type airplane deemed suitable for acrobatics. Acrobatics will include a 180-degree sharp turn, banking the plane between 80 and 90 degrees.

2. Reversement, otherwise known as "Immelman" or "renversement."

3. Tailspin of at least two turns.

4. Sideslip landing.

5. Demonstration that candidate has maintained his interest in the flying game as shown by his flying record, due consideration being given to the circumstances under which he has served.

6. Candidate should demonstrate before the board that he has a good general knowledge of the design and performance of service type airplanes and airplane motors, said demonstration to consist of a substantial oral examination before the board.

7. Candidate should demonstrate by means of a substantial examination before the board that he has a good general knowledge of aircraft armament and aircraft instruments.

8. The candidate shall, during the progress of the test, demonstrate his ability to fly both a monoplace and a multiplace airplane, if these types are possibly available.

The fatalities in aviation, in war and in peace, as compared to the other branches, are as follows:

WAR.

	Fatalities per 1,000.
Air Service:	
On front	154.2
Off front	48.78
Total	202.98
Infantry:	
On front	101.1
Off front	.441
Total	101.541
Artillery:	
On front	13.1
Off front	.572
Total	13.672

PEACE.	Fatalities per 1,000.
Air Service:	
Fatalities, flyers, in year 1919 (progress of aviation)	48.78
All other arms:	
Fatalities, officers, based upon 10-year period from 1907–1916	1.454

Due to the difficulty of qualification and the danger of military aeronautics, only 167 officers of the Regular Army have ever qualified as pilots since the beginning of aviation in this country.

Mr. FISHER. I presume that the staff would not be doing its duty if it detailed an Army officer and a naval officer, under Mr. Hull's bill, that were not fully advised as to aeronautics?

Gen. MITCHELL. It would not. It has never worked in the past, and we have not any flying officers at the head of aviation, either in the Navy or the Army, to-day as the result of it. If you are going to organize an air service in this country, the first thing you have got to do is provide that the aviation department be composed of people that know how to fly and know something about flying; otherwise, there is no use of having it. You might just as well have an infantry company handled by the captain of a tugboat.

Mr. JAMES. Gen. Menoher suggested striking out the words "designing and development," on line 14, page 3. Now, if there was a proviso in section 2 that the three assistant directors of aeronautics should be flyers, would that remedy the general criticism of section 3?

Gen. MITCHELL. I do not think it would entirely, for this reason: I think if you are going to leave the Air Service primarily in the Army and Navy that you should begin by making aeronautics an arm of these services; in the Army organization, for instance, on a parity with the Infantry, the Cavalry, and the Field Artillery. That is the first thing that you should do. Without that you will not have a corps of officers who will follow air work as a career. No flying officer in the Navy to whom I have talked expects to stay in aviation for a very long time. They expect to be detailed in and out, and they do not feel a fixity of career in that branch of the service. I believe that until you get a corps of officers who are essentially trained as air officers and mean to carry that out as a career you will not get aviation on its feet in this country.

Mr. HULL. General, does not your argument lead to a rather peculiar situation? According to your idea, if an Ordnance officer is going to make anything for the Cavalry, he would have to belong to the Cavalry?

Gen. MITCHELL. No; my idea is this: That the Ordnance officer would have to belong to the Army, and that an air officer should have air training in one or all branches of aeronautics but not as a ground officer in the Infantry, Cavalry, etc., alone. Your bill would be something like an ordnance department for the air force. That is just what we want, providing you have an air force with it.

Mr. HULL. No; an Ordnance man can belong to the Cavalry, to the Infantry, or to any one of these different separate branches.

Gen. MITCHELL. Aviation has just as many branches in it as the Army has. Attack aviation is just as different from bombardment aviation, we can show, as cavalry is from artillery.

Pursuit aviation is just as different from the other two as the other branches of the service, and we want those men with the

air training, who have developed those things, because otherwise I can not see——

Mr. HULL. Would you have the supply department of the Navy in charge of a man who is an actual seaman?

Gen. MITCHELL. I think the supply department is in charge of men who have had an education at Annapolis, and the men that direct the provision of fighting equipment certainly should have had naval training. In the case of the men that buy food and clothing and things of that kind, it is not so necessary, but when you come to guns, instruments, and all these accessories, it is extremely necessary that he be a man who knows the air game. We have some very able men in the Army from that standpoint now, all of whom are pilots.

Mr. HULL. I am quite in sympathy with the idea that these men should, if possible, be flyers, because every man knows more about it if he has had actual experience, but it does seem to me as if it would tie the hands of the President if you dictated to him that he had to make a certain appointment.

I presume that the President would, in all probability, appoint an actual flyer, but it certainly would be rather impertinent, it seems to me, for us to put in the bill something that would confine his appointment to certain people.

Gen. MITCHELL. Well, Mr. Hull, you put in the Army bill that a general officer must be selected from the Army, and in the Navy that an admiral must be selected from the Navy, and when you put aviation in control of people who can not know anything about it, you can not expect efficiency from it. That is the whole point. How can you expect efficiency from it?

Mr. FISHER. Suppose we pass a bill something on the order of Mr. Hull's and Mr. Morin's, which as you said on that diagram takes care of these supply departments, would that be a forward step in aviation, or would it be just simply standing still?

Gen. MITCHELL. I believe it would be a forward step.

Mr. FISHER. You do not think it would advance the cause of aviation at all?

Gen. MITCHELL. I believe it would decidedly.

Mr. HULL. It would call attention to the failure, if it was not successful.

Gen. MITCHELL. It would. If such a department were administered properly, and if it kept in close enough touch with air forces and services—military, civil, and commercial—it would do a great deal and would greatly advance aeronautics.

Mr. FISHER. Would this be possible? Would it be a forward step in aviation to pass, say, a bill of this kind, and then as quickly as Congress appreciates the advantage that came from it, by amendment to that provision tack on these other things?

Gen. MITCHELL. I think that it would be far preferable to the condition in which aeronautics finds itself in this country at present.

The following is a statement regarding the Forestry Service, together with copies of two letters, one from the Secretary of the Department of Agriculture and the other from the district forester, San Francisco, Calif.:

REPORT OF THE FOREST FIRE PATROL IN THE WESTERN DEPARTMENT, 1919.

National forests have for their object—to insure a perpetual supply of timber, to preserve the forest cover which regulates the flow of streams, and to provide for the use of all resources which the forest contain in the ways that will make them of largest service.

Fire, above all else, threatens and destroys present and future timber supply. It is through the destruction of forest and brush cover, a contributing cause to floods and their accompanying damage. It damages and destroys such other resources of the forest as forage; and it lowers, at least for long periods of time, the value of forests as health and recreation grounds for the people of the community, State, and Nation.

It follows, then, that fire protection is the most important activity of the United States Forestry Service. As a matter of fact, methods by which adequate forest fire protection may be given to the national forests is a problem on which the best efforts of forest officers have been concentrated ever since the inception of the forestry movement in this country. As a consequence a complete and comprehensive protection plan has been devised and the necessary equipment and personnel secured. The plan has been in operation for some years, with such modifications, additions, and changes as time, careful inspection, and thought, and painstaking scientific investigation in the various actions and results of forest fires have seemed to warrant.

REPORT OF AIRPLANE FOREST FIRE PATROL.

The first mentions, so far as is now known, of the use of airplanes in connection with forest-fire protection was made in 1909, when a resolution adopted at a meeting of forest supervisors held in El Paso, Tex., called attention to the possibilities of this method of fire patrol of the national forrests. The first actual application of this method was made in Wisconsin in 1915, carried out by a Curtiss four-passenger flying boat, equipped with a 100-horsepower 8-cylinder Curtiss motor.

Early in 1919 the Forestry Service requested of the War Department that cooperation in fire protection by means of airplane fire patrol be given by the Air Service as an experimental measure, and on national forests in the vicinity of regularly established aviation fields. This request was met by the War Department with a great deal of willingness, because of the opportunity offered for a useful method for training. Organized and sustained forest-fire patrol was therefore first attempted during the season of 1919. The service was first inaugurated in California. The work was performed by the Air Service, using its personnel and equipment. It was on an experimental basis, with the idea of determining the feasibility of using aircraft for this purpose by the actual establishment and operation of regular patrols, rather than by means of a few test flights.

Beginning June 1, air patrol was begun from Mather Field (near Sacramento, Calif.); from March Field (near Riverside, Calif.); and from Rockwell Field (near San Diego, Calif.). The individual routes established and followed were as follows:

From Mather Field there were two routes, the first going by Placerville, Auburn, and Nevada City to Oroville, with the return trip in the afternoon over the same route. The second patrol was from Mather Field to Placerville, thence south over the Eldorado Forest to Chinese on the Stanislaus Forest, the return being over the same route in the afternoon.

From March Field two routes were established, the first covering a circle on the Angeles Forest. The second route circled eastward to the south side of Mill Creek on the Angeles Forest, swinging south over Banning and covering the western slope of the San Jacinto Mountains, and the heads of the San Jacinto River on the Cleveland Forest, in turning back toward its base.

From Rockwell Field one patrol was established, the route covering the central portion of the Descanso district and the northeastern side of the range on the Palomar district, thus completing a patrol of the entire Cleveland Forest.

Thus, beginning July 1, five daily patrols covering national forest areas of exceptionally high values, were in operation, and twice each day five ships covered the better part of some six million acres of rough mountainous heavily-timbered country. The average nonstop run was in the neighborhood of 160 miles; the average round trip some 320 miles.

The opening of the hunting season in northern California in August witnessed a critical flareup of fires. An unusual number of fires was reported, and

for various reasons several of them assumed alarming proportions. Extension of the air patrol to cover practically all of the national forests of California was asked by the Forestry Service and was granted by the Western Department Air Service. Two new bases, one at Red Bluff and one at Fresno, were promptly established.

Existing air-patrol routes were modified. The Curtiss planes were replaced by De Haviland 4's, and on September 1 complete patrol twice daily of 15 out of the 17 national forests in California was inaugurated.

From Red Bluff the first of these new routes led east and north around Mount Lassen, across Hayden Hill to the landing field at Alturas. The afternoon patrol went west across the Modoc to the Shasta lava beds and the vicinity of Mount Shasta to Round Mountain, east to the eastern edge of the Lassen, and south and west again to Red Bluff. The second patrol out of Red Bluff went west to the California Forest, north to Delta, thence west over the Salmon River to Klamath River country, and back to the field at Montague. The afternoon run covered the country from Montague west and south over the Salmon River country, south for the full length of the Trinity National Forest on the coast side, and south for the full length of the California Forest on the coast side to a landing field at Lakeport. From Lakeport the return to Red Bluff was made via the valley side of the California Forest.

The first patrol from Fresno went east over the Yosemite to the landing point at Chinese, which was the southern run of the second of the Mather Field patrols. The return trip was over the same route. The second Fresno patrol went east over the high country, south across the Sequoia Park and the Sequoia Forest to Bakersville. The return trip was made over the same route in the afternoon.

On or about September 1, in addittion to the service rendered by regular forest patrols, aviators on cross-country flights and balloon observers at Arcadia were under instructions to report promptly to the proper authorities any and all fires which they might discover. In addition to these regular patrols by airplane, the balloon school at Arcadia stationed a balloon at an elevation of about 3,000 feet, where a view was had of the country on the south slope of the San Gabriel watershed between San Dimas and La Canada.

Observation was accomplished by Air Service personnel, except, as quite often happened, forest officers took flights either for the experience, to get first-hand information as to the possibilities of airplane control, or on special occasions to get first-hand, definite information about the fire situation in general or about conditions in some individual fire.

ACTUAL ACCOMPLISHMENTS OF AIRPLANE PATROL.

The outstanding feature of airplane patrol in California during 1919 was the fact that, with no previous planning, daily and practically uninterrupted service was continued from June 1, the date originally set, until October 31, the end of the fire season.

For the period June 1 to August 30 five patrols covered twice each day an acreage of some 5,035,142 acres of land within five national forests, and in addition an unestimated acreage of private lands outside the forests was also covered. The Government timber patrolled during this period is estimated at 20,219,565,000 feet, board measure, worth some $40,439,130. In accomplishing this work a total of approximately 745 flights actually covered 92,605 miles. There were discovered, located, and reported a total of 118 fires, 23 of them being both discovered and reported in advance of the regular Forest Service detection organization, which was, since the airplane was experimental only, still on the job.

Beginning September 1, airplane patrol was extended to cover 15 out of the 17 national forests in the State. From September 1 to October 31 daily airplane patrol covered then some 21,484,368 acres of land within the national forests, on which was growing 105,112,460,000 feet of Government timber, worth some $210,224,920. In addition to the figures given above, a very appreciable acreage of private timberlands outside the national forests was covered by the patrol, and it is entirely probable that the figures for stumpage and for the value of that stumpage might approximately be doubled if the total amount and value of all timber covered by airplane patrol in California were sought.

The total number of flights, number of miles covered, fires discovered, etc., for the entire season—June 1 to October 31—is, according to data received, as follows:

Field.	Number of miles.	Total number of fires discovered.
Mather	47,658	155
March	68,549	147
Rockwell	36,854	24
Red Bluff	29,239	107
Fresno	19,709	9
Total	202,009	442

Suppression.—It has been found entirely practical to get quicker, more complete, and more satisfactory progress reports either on a series of small and widely scattered fires or on large conflagrations by means of the airplane than by any other method so far tried. In fact, the airplane patrol in California has performed a real and very vital service in connection with obtaining progress reports on fires and in connection with securing, quickly and accurately, information absolutely essential to the direction of suppression work. It was established beyond the shadow of doubt at the Tejunga and San Gabriel fires on the Angeles National Forest, September 15 to 27 of 1919, that airplanes in connection with fire suppression have a real value and a value which can hardly be overestimated. These fires were in rough and inaccessible country. They eventually covered some 165,000 acres, and in their suppression better than 2,000 men were employed. The situation was, as a whole, probably the worst California has ever experienced.

The supervisor, realizing as soon as the fires assumed alarming proportions, that his most difficult problem was to keep informed of changing conditions on all fronts rapidly enough to direct operations in a way to get the most effective use of all fire-fighting forces, and at the same time to insure their safety, called on the Air Service, March Field, for assistance. A ship and pilot were promptly put at his service. Each morning the supervisor spent two to three hours flying directly over the fire. By the use of the plane he was enabled in this short time each day, to view the progress of the fires and to get reliable and accurate information on which camp locations were decided, fire lines determined, men moved, and, in short, the entire fight directed.

Furthermore, airplane reconnoissance added greatly to the safety of the men fighting the fire, since it was possible to tell from a ship much sooner than from the ground when a camp was threatened. As a matter of fact, when the fires were at their height, the information obtained by the use of a plane in from one to three hours each day could not have been obtained by the usual methods employed (getting around the fire on foot or horseback) in less than four or five days, and much of the information obtained in the latter manner would naturally have been useless by the time it could have been used.

Incidentally one forest officer, returning from such an inspection trip, determined from the atmospheric conditions he observed at comparatively high elevations that it was going to rain, and upon landing called by phone the Los Angeles office of the Weather Bureau and told them of the forthcoming shower, which had not been officially forecasted, but which actually materialized within 24 hours.

In view of this actual experience, it seems entirely possible that the estimate of a northern California supervisor, who figured that his fire suppression expenses, totaling $30,000, could have been reduced by one-third had planes been available for inspection and control on the larger fires, may be entirely justified.

FIRE COOPERATION—USE OF AIRCRAFT.

DECEMBER 6, 1919.

The SECRETARY OF WAR.

SIR: I had the pleasure of informing you by letter of October 29 of the success during the past season of the cooperative forest-fire patrol by airplane in California and the Northwest, conducted by the Air Service and the Forest Service. I expressed the opinion at the time that the development of aircraft for forest-fire protection and suppression seemed desirable as a permanent phase of forest administration.

I am informed that the experiences of the past season in airplane patrol have been thoroughly reviewed recently by the Air Service officer of the Western Department and local representatives of the Forest Service and owners of private timber, and that they have recommended the continuance of the cooperative plan on a more intensive basis for the season of 1920. The plan proposed contemplates a joint conference of Air Service and Forest Service representatives at March Field, Calif., for a period of from four to six weeks for the purpose of training the personnel of both services by suitable instructions and field work in the various phases of this new type of air control. The experience of the past season has shown the excellent results that may be expected from a thorough familiarity by the personnel of each service with the work and duties of the other. The plan involves also matters of detail, such as securing quartermaster privileges at March Field for forest officers while serving there and the need of some additional airplane equipment for communication from the Signal Corps. If you agree with me as to the desirability of continuing the cooperative plan for the season of 1920, I would suggest that, if consistent with the policy of your department, the arrangements for perfecting it may be delegated to the War Department services directly concerned and the Forest Service. I hope very much that this project, which has proved so promising in its possibilities as a means of reducing the number and severity of forest fires, may be continued in 1920.

Respectfully,

D. F. HOUSTON, *Secretary.*

OCTOBER 1, 1919.

Lieut. Col. B. K. YOUNT,
Commanding Officer March Field, Atcssandro, Calif.

DEAR COL. YOUNT: Now that the rain has put an end to the fire season, I want to write you and express my appreciation of the part played by you and the men of your command in the recent fire emergecy on the Angeles National Forest. For the first time in history of forestry, aircraft played a very important part in a big fire fight.

The three fires on the Angeles Forest had covered about 165,000 acres. Some 2,000 men were employed in the fight and the transportation and supply systems that we were able to organize were taxed to their utmost. It was the worst fire situation that I have seen during 18 years' service.

In any large fire fight, one of the most difficult problems is to keep informed of the changing conditions on all fronts rapidly enough to direct operations in a way to get the most effective use of all fighting forces, and at the same time insure their safety. The use of the planes provided by you for observation trips by Mr. Johnston, Mr. Charlton, and myself directly over the fire lines was a revelation as to the quickness with which up-to-the-minute information could be secured.

I remember fires on which 24 hours of the most laborious travel horseback and on foot were necessary to get a comprehensive idea of the perimeter of the fire—and one could never be sure that the situation had not materially changed during the duration of the trip. On the Angeles Forest I got a complete view of the line of the two largest fires and platted it on a topographic map in an hour and a half flight. On the information secured by these flights camp locations were decided, fire lines were determined, men were moved; in short, the entire fight directed. Furthermore, the airplane reconnoissance added greatly to the safety of the men fighting the fire since it was possible to tell from a ship much sooner than from the ground when a camp was threatened.

In addition to your help in providing ships and pilots for the forest officers directing the fight, you maintained the regular patrol and relieved us from the uncertainty that something was starting elsewhere undetected.

Your cooperation is sincerely appreciated both personally and officially by myself and I want to extend the thanks of the Forest Service to you. In addition, will you convey the thanks of the Forest Service to Lieuts. Foster, Brand, Colliver, and Vassar for their work in aiding in observation during the fire fight, and Lieuts. Moore, Morris, and Tonkin for their work in keeping up the patrol under trying conditions. I hope Lieut. Tonkin is none the worse for his nerve-racking experience.

Very sincerely, yours,

COERT DU BOIS,
District Forester.

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